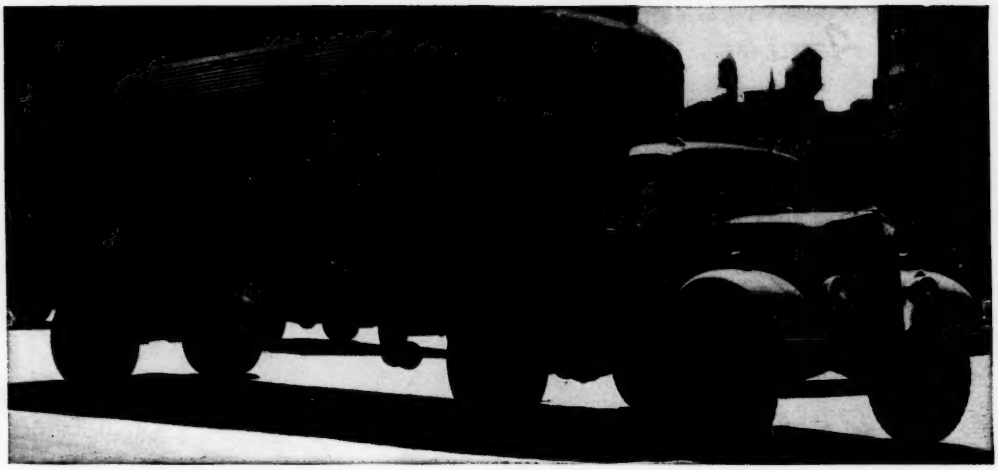
ICE AND Refrigeration

PUBLISHED BY NICKERSON & COLLINS CO., CHICAGO - NEW YORK

58th YEAR ★ SEPTEMBER, 1949



STOP LOOK LESSEN

maintenance costs

HIT IT! *Marfak* won't splatter like ordinary grease—proof that heavy loads and rough roads won't hammer it out of spring shackles, tie rods and other chassis parts... that *Marfak* gives safer, longer-lasting protection with fewer applications.

Texaco Marfak assures longer life for all chassis parts.

Texaco Marfak is the longer-lasting, chassis lubricant that *stays on the job.* Heavy loads and rough service won't squeeze or jar it out of bearings. *Texaco Marfak* seals against abrasive dirt, keeps rust-forming moisture off metal. Parts last longer, maintenance costs less.

In wheel bearings, use *Texaco Marfak Heavy Duty.* It provides fluid lubrication inside the bearing, but retains its original consistency at the edges . . . sealing itself in (assuring safer braking!), sealing out dirt and moisture. Protects against rust, too. No seasonal change is required.

For lower *engine* maintenance costs, lubricate with *Texaco D-303 Motor Oil.* It is fully detergent and dispersive, keeps engines clean—thus reduces wear, assures better performance and longer life for all engine parts.

Let a Texaco Lubrication Engineer show you how Texaco products can increase efficiency and economy throughout your operation. Just call the nearest of the more than 2300 Texaco Wholesale Distributing Plants in the 48 States, or write The Texas Company, 135 East 42nd Street, New York 17, New York.

MORE THAN 300 MILLION POUNDS OF MARFAK HAVE BEEN SOLD!

TEXACO

TEXACO Lubricants and Fuels

FOR ALL TRUCKING EQUIPMENT

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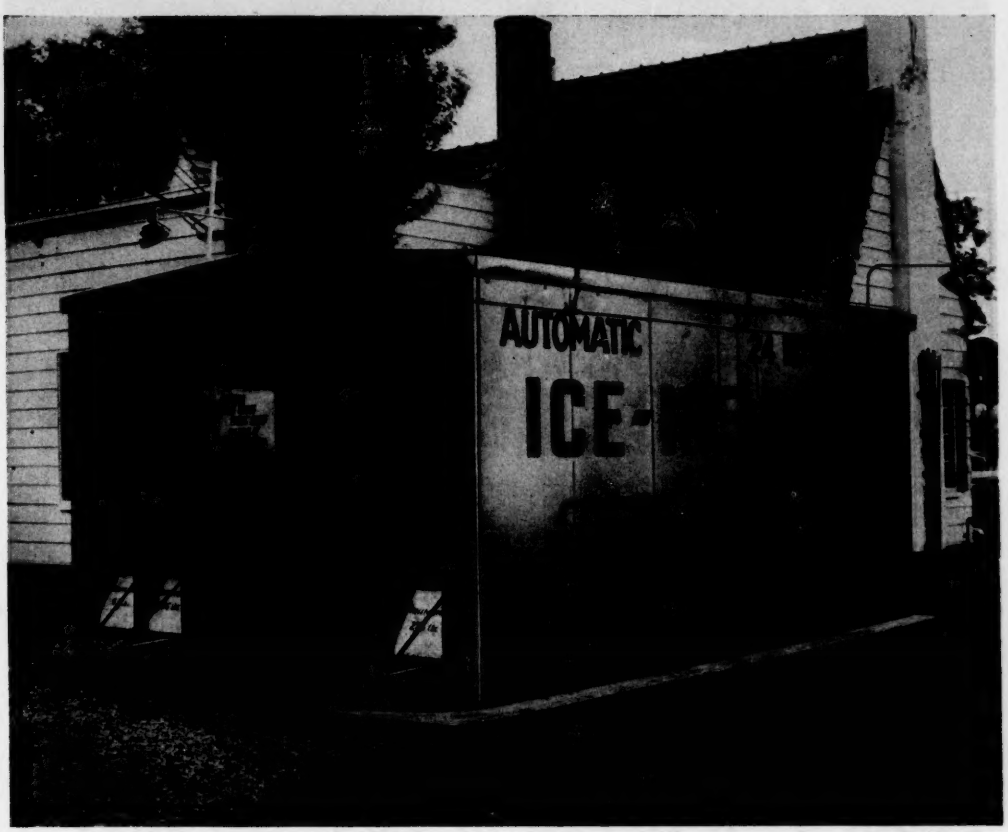
Another **POLAR** *Installation Selling More Ice* **AUTOMATICALLY**



Owners OF POLAR ALUMINUM REFRIGERATED ICE STATIONS *Report*—

INCREASED SALES and GREATER PROFIT AT LOWER DISTRIBUTION COSTS!

You, too, can sell more ice to more people, for more profit, by merchandising ice in automatic, coin-operated Polar aluminum ice vending stations. The Polar station attracts customers . . . has ample storage space . . . vends blocks or cube ice automatically. The Polar station is a dependable salesman who will work for you 24 hours a day, every day, year after year!

REFRIGERATION ENGINEERING COMPANY
211 Foshay Tower, Minneapolis 2, Minn.

CHECK THESE OUTSTANDING FEATURES OF POLAR ICE VENDING STATIONS

- ✓ AIRCRAFT ALUMINUM CONSTRUCTION
- ✓ COIN MECHANISM THAT ADDS CHANGE
- ✓ HEAVY DUTY REFRIGERATION UNIT
- ✓ 24 HOUR AUTOMATIC SERVICE
- ✓ LOW OPERATING COST
- ✓ LOW UPKEEP

REFRIGERATION ENGINEERING COMPANY
211 Foshay Tower, Minneapolis 2, Minn.

Send me your 1950 catalog on POLAR ice vending stations

Name_____

Address_____

_____

YOU TOO, CAN SIT BACK AND RELAX —

when you have installed a

MARTOCELLO AIR SYSTEM!

YES, YOUR WORRIES ARE OVER, BECAUSE MARTOCELLO CLEAR RAW WATER AIR AGITATION SYSTEMS MEAN CLEANER, CLEARER, AND MORE SANITARY ICE

REMEMBER YOUR REFRIGERATION SYSTEM MAKES ICE —BUT YOUR AIR SYSTEM SELLS IT

SO DON'T BE SATISFIED UNLESS IT'S

"NOTHING BUT THE BEST"

NORTH, EAST, SOUTH or WEST

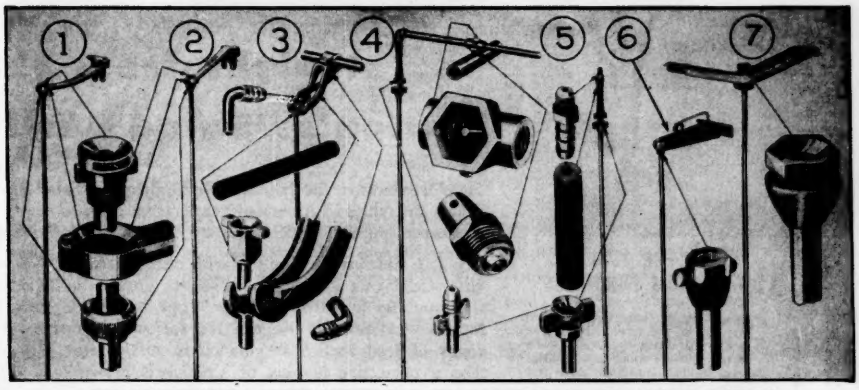
all points lead to

Martocello

Known the World Over

For it's fine quality products and

AIR AGITATION SYSTEMS



THE ILLUSTRATION ABOVE SHOWS THE FOLLOWING CLEAR ICE MAKING SYSTEMS

1. MARTOCELLO SELF-CENTERNG DROP TUBE BRACKET, Offset Form
2. MARTOCELLO SELF-CENTERNG DROP TUBE BRACKET, Straight Form
3. MARTOCELLO SERIES DROP TUBE BRACKET
4. DOUBLE BRACKET SYSTEM ASSEMBLY
5. SERIES DROP TUBE ASSEMBLY
6. GALVANIZED STEEL TRUNNION TYPE BRACKET ASSEMBLY
7. GALVANIZED STEEL SADDLE BRACKET ASSEMBLY

FOR PROMPT EFFICIENT SERVICE — PHONE, WIRE OR WRITE TODAY!

Represented on the West Coast by Western Ice Equipment Co., 420 Market St., San Francisco, Calif.

Jos. A. Martocello & Co. 229-231 NORTH 13th STREET PHILADELPHIA 7, PA.

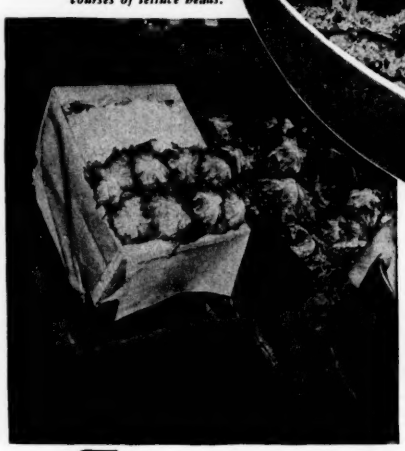
"Serving the Ice Industry Since 1916" . . . *"There is no Substitute for* MARTOCELLO QUALITY"

Delivered Delicious...

A final layer of Vogtice is put in place before closing the crate.

Layers of Vogtice are placed on the crate bottom and between the courses of lettuce heads.

Harvesting lettuce in the field with a traveling conveyor which delivers the heads to a truck.

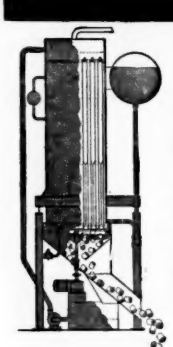


...straight from the Nation's "Salad Bowl"

Head lettuce from the Salinas Valley, California "Salad Bowl" graces the tables in American homes from coast to coast. In the season, shipments will average 135 refrigerator cars daily.

The J. J. Crosetti Packing Co. with headquarters at Watsonville, California is one of the largest growers and packers and operates a battery of four Vogt Automatic Tube-Ice Machines to provide Vogtice for carload shipments. The crates of iced lettuce are loaded in refrigerator cars and then a protective blanket of Vogtice is blown over them to retain freshness and crispness for distant markets.

Vogtice is playing an increasingly important role in the cooling, processing and preservation of foods and beverages. Our new Bulletin TI-3 gives the general information and will be sent upon request.



HOW THE TUBE-ICE MACHINE FUNCTIONS

In making ice, water is pumped to the top of the freezer and flows downward along the inside walls of tubes into a water tank. Refrigerant in shell surrounds tubes and freezes water into cylinders of ice. An automatic timing mechanism operates suitable valves to control all functions of the machine. Ice is freed from the tubes by thawing when the refrigerant is displaced by high pressure warm gas from the compressor.

Employing direct application of the refrigerant, all expense incidental to other systems is eliminated.

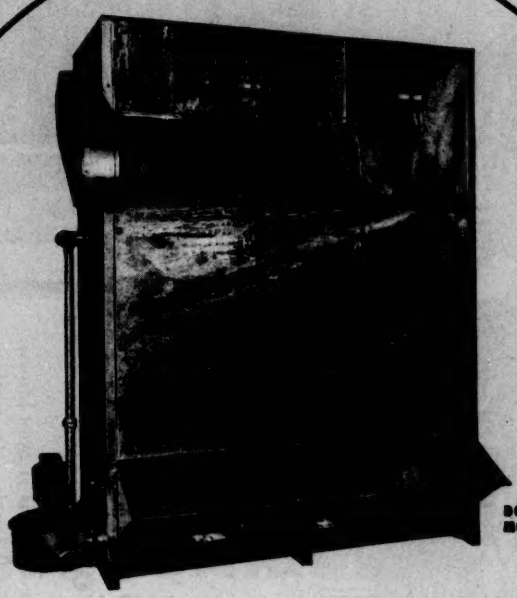
Patent Numbers 2,200,424, 2,239,234, 2,396,308, 2,444,514, 2,453,140.

HENRY VOGT MACHINE CO., LOUISVILLE 10, KY.

BRANCH OFFICES: NEW YORK • PHILADELPHIA
CLEVELAND • CHICAGO • ST. LOUIS • DALLAS

Vogt *Automatic* TUBE-ICE MACHINE

HOT-DIP GALVANIZED*



DOUBLE-FAN MODEL

*Acme EVAPORATIVE CONDENSERS

Now, for further protection against corrosion, all steel parts including wheels and scrolls on Acme Evaporative Condensers are completely *Hot-Dip Galvanized* after fabrication—and at no increase in price. Units are assembled using stainless steel nuts, bolts and screws.

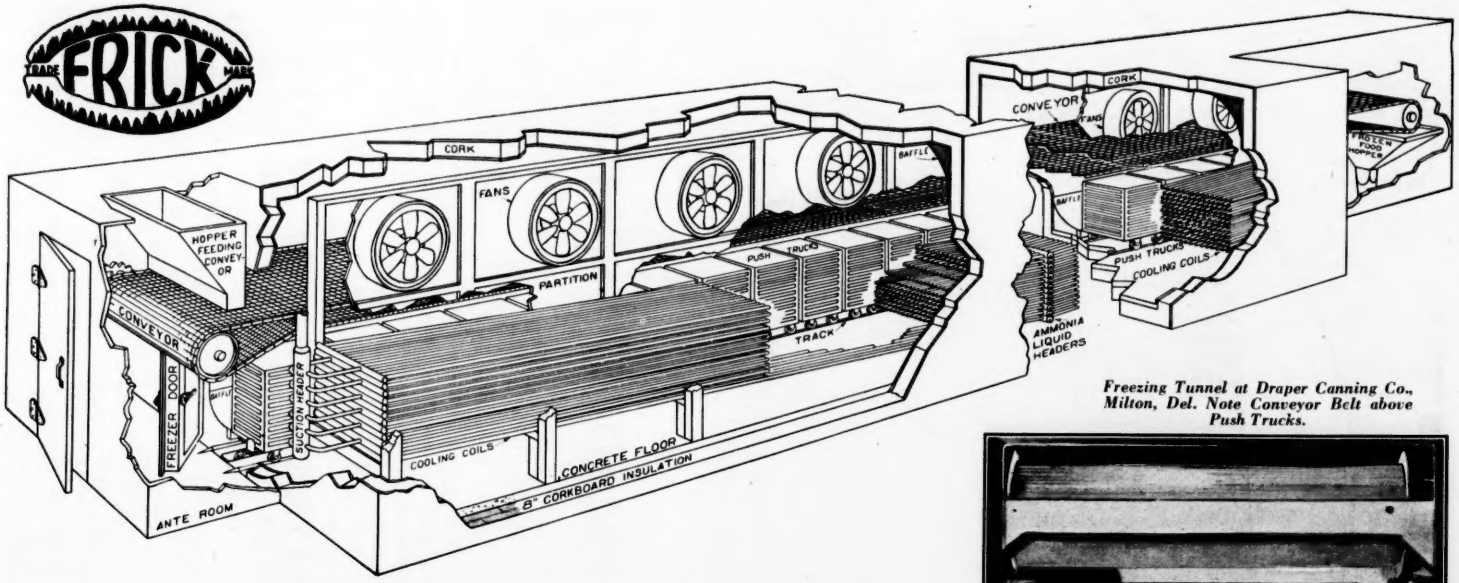
Designed for unusually large water savings, outstanding performance and long life—there's a size and model Acme Evaporative Condenser for practically every Freon or Ammonia application. Write for Catalog No. 527 for further details.

ACME INDUSTRIES, INCORPORATED

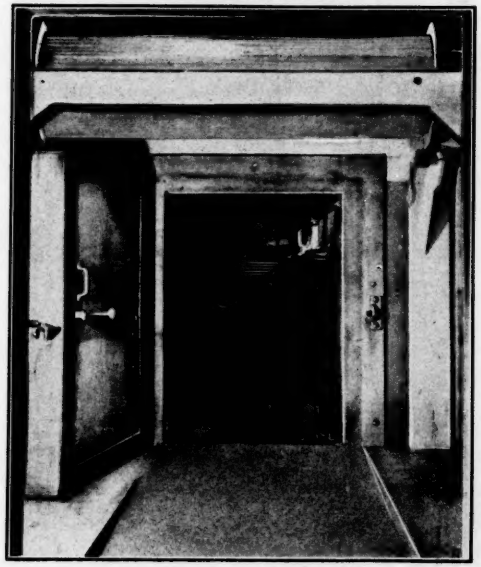
OUR 30TH ANNIVERSARY OF CONTINUOUS SERVICE TO THE REFRIGERATION INDUSTRY

JACKSON, MICHIGAN

Representatives in Principal Cities



Freezing Tunnel at Draper Canning Co., Milton, Del. Note Conveyor Belt above Push Trucks.



Frick-Freezing Tunnels Handle ANY and ALL Foods

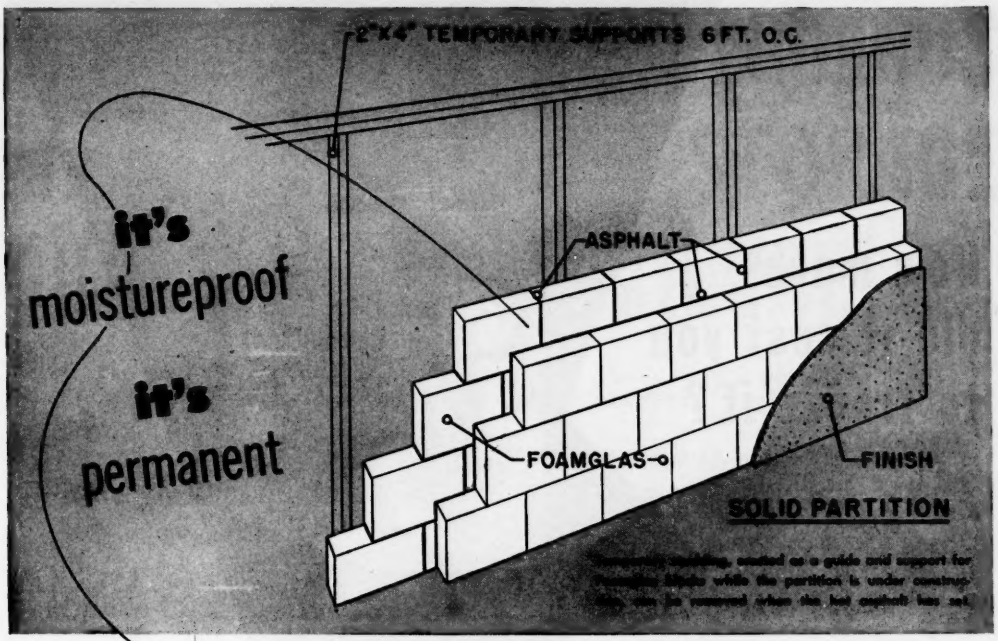
And do it with certainty. No tricky mechanisms: very cold air is simply blown over the product, which is placed on either a conveyor or push trucks. Operation can be in batches, or continuous. Freezers built in types and sizes holding one or more push trucks, up to 60 feet in length. Get further details now! Ask for Frick Bulletin 147.

DEPENDABLE REFRIGERATION SINCE 1882

FRICK CO.

WAYNESBORO, PENNA. U.S.A.

Also Builders of Power Farming and Sawmill Machinery



it's FOAMGLAS

● Moisture cannot get into or through PC Foamglas insulation. That is one of the main reasons why it is so widely used for low temperature installations.

The wide difference in temperature between inside and outside surfaces—in inner partitions and outer walls—tends to condense moisture, to cause many insulating materials to get soggy, to ice up, to lose insulating efficiency when used in refrigerated space.

But Foamglas, being a true glass in cellular form, has all the insulating qualities needed for effective refrigeration, and also is impervious to destructive elements. It withstands humidity, is fireproof, verminproof, acidproof. In walls, floors, ceilings and on roofs of cold storage plants, PC Foamglas—without repairs, maintenance or replacements—retains its original insulating efficiency *permanently*.

Our insulating specialists will be glad to show you where and how you can use PC Foamglas to the best advantage on your special insulating applications. Meanwhile, we shall be glad to send you a free copy of our latest folder on customary uses of PC Foamglas insulation for refrigerated space. Just send in the coupon and your free copy will be mailed at once.

This is FOAMGLAS®

The entire strong, rigid block is composed of millions of sealed glass bubbles. They form a continuous structure, so no air, moisture, vapor or fumes can get into or through the Foamglas block. In those closed glass cells, which contain still air, lies the secret of the material's permanent insulating efficiency.

For additional information see our inserts in Sweet's Catalogs

PITTSBURGH PC CORNING

FOAMGLAS INSULATION

Pittsburgh Corning Corporation
Dept. Y-99, 307 Fourth Avenue
Pittsburgh 22, Pa.

Please send me without obligation, a free sample of PC Foamglas and your FREE folder on the use of PC Foamglas Insulation for refrigerated space.

Name_____

Address_____

City_____ State_____

... when you insulate with FOAMGLAS ... you insulate for good!

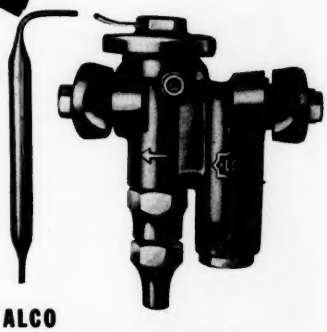
How much did it cost you to freeze it?

TOO MUCH.....if your ammonia controls are obsolete.

How long has your control system been on the job? Better check up. It may be melting away quite a chunk of your profits every month in excessive operating and maintenance costs—without your realizing it!

Replace *now* with new ALCO Ammonia Controls that coax every last ounce of efficiency out of your ice or cold storage plant. They'll pay you "cold cash" dividends in more dependable, economical operation year after year.

THERMO EXPANSION VALVES — from fractional tonnage to 60 tons
SOLENOID LIQUID VALVES — up to 172 tons
SOLENOID SUCTION VALVES — up to 28 tons
FLOAT SWITCHES



ALCO AMMONIA CONTROLS

Write for our Ammonia Control Bulletins now and get the *full facts* on more profitable ammonia control

ALCO VALVE CO.
835 KINGSLAND AVE. • ST. LOUIS 5, MO.

Designers and Manufacturers of Thermostatic Expansion Valves; Evaporator Pressure Regulators; Solenoid Valves, Float Valves; Float Switches.

3052

CORK INSULATION SAFEGUARDS MILLIONS IN FOOD STORAGE DURING POWER FAILURE.....

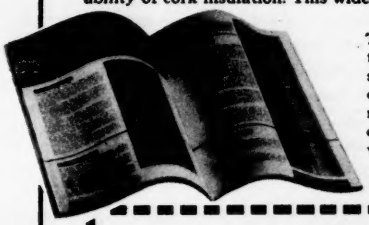
perishables—[illegible] entirely without power.
Half a foot of cork insulation would keep temperatures low for several days, it was said.

The emergency came suddenly in a teeming metropolitan area. Power failed while the city wilted in record heat. Perishables in storage, worth millions of dollars, were threatened with spoilage . . . and then someone remembered that the cold storage warehouses affected by the power 'black-out' had cork insulation. The public was assured that this would keep temperatures low despite the heat blight; perishables would be safe for several days.

The incident serves to show how important is the *reassuring dependability* of cork insulation. This widespread confidence in cork comes from tested and proved performance . . . from the record of service over many years.

Your plant may never be faced with a power stoppage, but it is reassuring to know that under the most severe conditions, your cold rooms have the best insulation that money and science can provide.

In Mundet Corkboard you get cork at its best . . . processed to insure longest, most efficient insulating service. Whether you have small or large facilities for low temperature it pays to specify Mundet Corkboard.



The best insulation requires competent installation. You benefit from the experienced erecting services that are offered by Mundet branch offices. Corkboard is available for prompt shipment from nearby warehouses. Send coupon for copy of Mundet Cork Manual. Prepared in convenient filing size, with cork specification data.

Mundet district offices are located in these cities:

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INDIANAPOLIS
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KANSAS CITY 7, MO.
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(Maywood)
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2415 South Third Street
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Mundet Cork & Insulation, Ltd.
35 Booth Avenue, Toronto

Write us for name of our nearest representative if there is no Mundet office in your city.

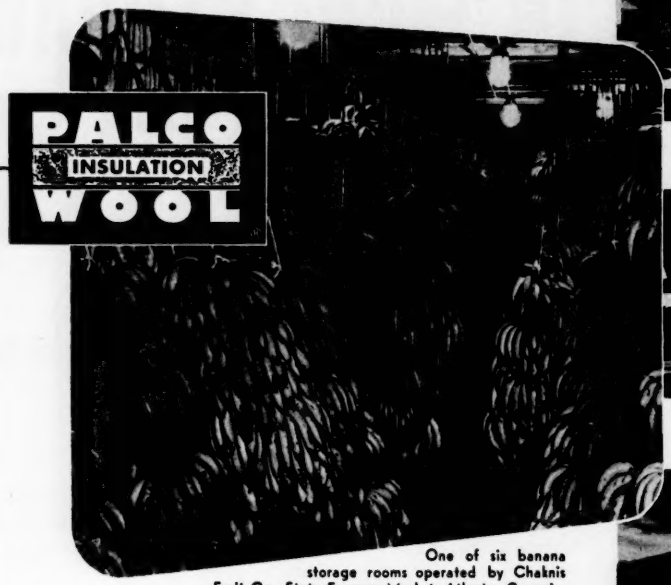
MUNDET
CORK INSULATION

MUNDET CORK CORPORATION
Insulation Division
7101 Tonnelle Ave., North Bergen, N. J.

Please send copy of Mundet Cork Insulation Catalog in handy reference size.

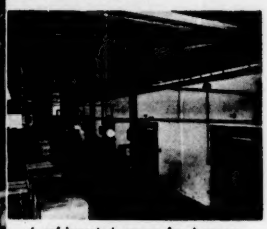
Name .....
Company .....
Address .....
City ..... *Zone* ..... *State* *RE9*

MOISTURE-RESISTANCE of PALCO WOOL pays off in BANANA PROFITS



One of six banana storage rooms operated by Chaknis Fruit Co., State Farmers Market, Atlanta, Georgia. High humidity and rapid temperature changes create special condensation problems.

Warm Southern climate makes high efficiency of Palco Wool doubly important in maintaining profits at this Atlanta plant.



6 refrigerated rooms for bananas and 2 for fruit storage account for approximately 5,500 sq. ft. of refrigerated area at Chaknis Fruit Co.

C. L. Fain Co., also at Atlanta Farmers Market, protects 6000 sq. ft. of refrigerated area with Palco Wool Insulation. This includes 4 banana rooms, 3 for produce.

Refrigerated rooms of this Fain Co. plant, as well as those of Chaknis Co., were designed and built by Southern Insulation & Supply Co., of Atlanta.

Condensation is always a problem, but it's a *vital* question in banana storage. Rooms are held around 56 F, raised to about 70 F for ripening, then brought back to the 56 F range. These rapid changes plus high humidity mean excess condensation. Even with most modern vapor-seal methods, insulation MUST be moisture-resistant. That's why Palco Wool Insulation is ideal for banana storage—and all low-temperature operations. Like the age-old Redwood bark from which it is made, Palco Wool is noted for non-hydroscopic characteristics. Fibers will not absorb any perceptible amount of moisture from the air. Even when submerged, they will not support capillary action. This means that year after year Palco Wool will retain its extremely high efficiency with a thermal conductivity of only .255 Btu. In addition, it is the only flame-proof Redwood bark insulation. Non-settling, odorless and odor-proof, resistant to rodents and insects, and low in cost—PALCO WOOL is the ideal low temperature insulation. Investigate before you insulate!

Write today for the PALCO WOOL COLD STORAGE MANUAL *or the* LOCKER PLANT PLAN *and* CONSTRUCTION MANUAL

FLAMEPROOF INSULATION FROM DURABLE REDWOOD BARK

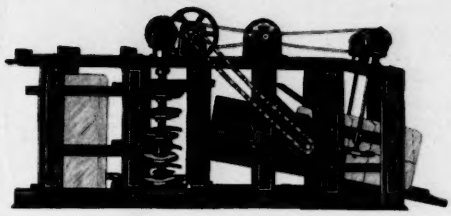
THE PACIFIC LUMBER COMPANY

100 Bush Street, San Francisco 4, California

5225 Wilshire Blvd., Los Angeles 36, Calif. 35 E. Wacker Drive, Chicago 1, Ill.

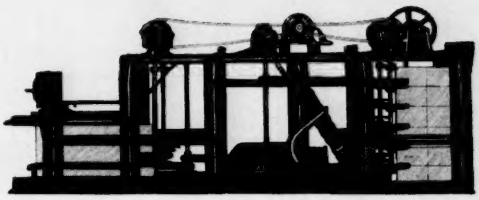
★ Perfection A MODEL FOR EVERY REQUIREMENT ★

PERFECTION REGULAR



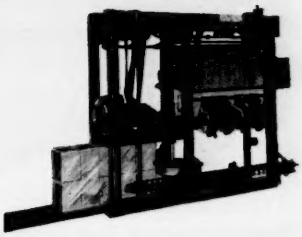
The Perfection REGULAR receives the ice block standing on end, scoring it crosswise first. Then the block enters the tilting cage which turns the block down and it slides by gravity through another set of saws that score it lengthwise. In one operation the REGULAR will score the blocks into any size pieces desired. This machine in 300 and 400 pound size, is 31 inches wide with saw guards in place, or 26 inches wide with saw guards removed. Capacity is six blocks per minute or 360 blocks per hour.

PERFECTION SPECIAL



The PERFECTION SPECIAL receives ice blocks on edge, scores them lengthwise first. Then heads up the blocks, scores them crosswise and discharges them standing on end. This is a combined heading and scoring machine and scores the blocks into any size pieces desired in one complete operation. Capacity is 4½ blocks per minute or 270 blocks per hour.

PERFECTION "MILLER"



The MILLER machine receives the ice block lengthwise on edge. It is first lifted up and scored crosswise, passing the same saws again on the way down. It is then (without leaving the machine) automatically conveyed through the saws which score it lengthwise. Only one operation is necessary for complete scoring. Block is put through machine only once. The capacity is six blocks per minute, or with 300 lb. blocks, over 50 tons per hour. With 400 lb. blocks this output is increased to 65 tons per hour.

PERFECTION ICE CHUTE

A Perfection Ice Chute offers progressive ice merchandisers the surest way to give such service. Just pull a lever, out comes a cake of ice. The job is done in one-tenth of the time required under old methods. Customers are pleased. . . . Costly refrigeration is saved. . . . Business is increased. . . . Profits multiplied. The ice chute is built in two types; the straight chute, and the parallel.

The Old Reliable Perfections have been known for their rugged dependability and long life for more than two decades.

Repair parts for all current models available for immediate shipment.

WRITE FOR MORE INFORMATION

A 35-YEAR SERVICE RECORD BYERS WROUGHT IRON PIPE

There's no substitute for experience as a guide in selecting pipe for corrosive services, and no better place to find it than right at home. The California Consumers Corporation, one of the largest on the Pacific Coast, recently converted seven cooler storage rooms to frozen food storage in the Los Angeles Cold Storage Company plant. Mr. Regis Gubser, Chief Engineer, had previously removed a quantity of Byers Wrought Iron pipe from an installation where it had served for 35 years, and found its condition so good that it was all reinstalled. Byers Wrought Iron pipe was selected for the ammonia coils in the current job.

Rooms are to be maintained at a temperature of -10° F. They are approximately 44 ft. by 92 ft., and about 5400 ft. of 1¼-inch wrought iron was used in each. Some of the pipe was bent 180° on 6-inch centers—extremely punishing fabrication. This was accomplished with an ordinary cold bending machine, with no flattening of the pipe reported. Gas welding was used.

Byers Wrought Iron pipe has served in refrigeration work for many years, and reports of its unusual durability have come from all sections of the country. As one example—a Washington concern wrote that 22-year old wrought iron direct expansion coils were removed when a plant was demolished, reinstalled, and after 19 years in the new location were still in excellent condition. Even more impressive records have been made in brine tank coils, where the corrosive conditions are even more severe.

Wrought iron's ability to serve longer comes from its unique composition and structure. Tiny fibers of glass-like silicate slag, threaded through the body of high-purity iron, halt and "detour" corrosive attack, and so discourage pitting. The fibers also anchor the initial protective scale, which shields the underlying metal.

Our bulletin, WROUGHT IRON IN REFRIGERATION AND AIR CONDITIONING SYSTEMS, will give you some helpful information on reducing maintenance in your piping services. Ask for a complimentary copy.

A. M. Byers Co., Pittsburgh, Pa. Established 1864. Boston, New York, Philadelphia, Washington, Atlanta, Chicago, St. Louis, Houston, Salt Lake City, Seattle, San Francisco. Export Division: New York, N. Y.

CORROSION COSTS YOU MORE THAN WROUGHT IRON

J. F. NICKERSON, Founder

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"Our sanitary standards demand Packaged Processed Ice"

SAYS JOSEPH J. HACK, JR. OWNER-MANAGER, WESTLEIGH INN, LITCHFIELD, CONN.

The Westleigh Inn is one of the top-flight inns of New England. And the village of Litchfield ten miles from the nearest railroad station and 33 miles from Hartford, is a "storybook" New England village.

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IN THIS ISSUE —

Accurate Low Temperature

In many process applications of refrigeration, exact control is just as important as low temperature if full results of the system are to be obtained. This is especially true in the processing and preparation of a number of products utilized by the medical profession. In fact the development of many such preparations has been coincident with the development of accurate refrigeration controls. The article by R. B. Gochenour on page 17 describes an interesting process of this type and the system that controls it.

Handling and Shipping Fruits and Vegetables

Handling and shipping methods and refrigeration of fresh fruits and vegetables are all important from the standpoint of bringing them to the market in sound condition and attractive appearance and with their nutritional value unimpaired. The various aspects of this subject are well covered in a paper presented at a meeting of the Nutrition Institute. It is published on page 20.

Cold Storage Holdings

Report on cold storage holdings for July 1 shows that there was an increase over June 1 for both cooler and freezer space but that, in spite of this increase, occupancy was the lowest it has ever been for this season of the year since records have been compiled. The report is summarized on page 35.

Ice Advertising

At a recent meeting of top executives of the National Association of Ice Industries held in Chicago, plans were made to raise $500,000 for the 1950 Public Relations Campaign, with a minimum goal of $450,000. A concentrated drive will start September 1 to encourage more ice companies to invest in this business building program. For details see page 37.

Turkey Price Support Program

The U. S. Dept. of Agriculture has announced its program for support of produce prices of live turkeys at a national average of about 34 cents a pound. This is expected to approximate 90 per cent of parity for the marketing season. Details are given in the article on page 33.

Guard Portable Tools

Many people are inclined to disregard the hazards connected with 110 volt current. Injuries and death resulting from the source prove that this course is very unwise. A number of companies have taken steps to safeguard workmen from the hazards in connection with electric drive, portable hand tools. On page 27 A. L. Shepler describes a program to protect workmen against breakdown of insulation in such tools or their connections.

Concrete Made with Light Weight Aggregates

Insulating value can be built into concrete walls by the use of special light weight aggregates. The use of concrete of this type, however, brings on several inherent problems including greater cost per unit of volume. Moisture absorption is greater in the light weight concrete and strength is also reduced along with the reduction in weight. Yet these concretes present certain advantages which may be of greater consequence. The pros and cons of this type concrete are presented on page 24.

Saleswoman Sells Ice and Appliances

When the Kilbourn Brothers, owner of an ice plant at Panama City, Fla., formulated an active merchandising program they assigned a stellar role in carrying this program into effect to Mrs. Voy Hodges. Her experience, starting with preliminary tests and surveys, followed by successful selling of equipment for vegetable icing is told in the article on page 43.

Steam Plant Operation

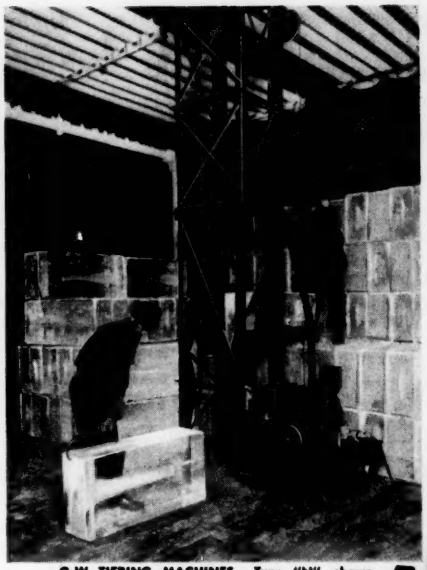
There is much more to boiler plant operation than simply producing the required pounds of steam per hour as C. T. Baker shows in the article on page 48. He discusses the fundamentals of boiler and furnace design and operation and draws on his wide experience to show how good methods will bring significant results in overall economy. The discussion covers the types of boilers and auxiliaries found in most refrigerating and allied plants.

Government Egg Program

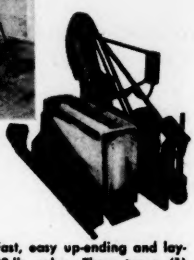
A recent survey by the Institute of American Poultry Industries shows that the government's 1948-49 egg support program at 90 per cent of parity had an unfavorable effect on the quality egg marketing programs of egg buyers. For details see the article on page 31.

TO CUT HANDLING COSTS SAVE TIME SAVE LABOR— WHEN YOU STORE ICE

USE G-W EQUIPMENT



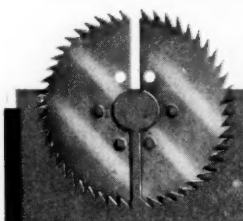
G-W TIERING MACHINES — Type "N", shown, will stack 300 or 400-lb. cakes up to ten tiers high, safely, quickly, economically. Electrically operated, this portable unit is equipped with convenient, visual tier finder and push button control. Write for Bulletin No. 451.



G-W UP-ENDERS — Fast, easy up-ending and laying down of 300-400-lb. cakes. Three types: (1) Full automatic; for use with storage room conveyors. (2) Automatic unit with adjustable discharge; up-ends and elevates cake to platform or skid in one operation. (3) Semi-automatic; for up-ending and lowering cakes; lift-about device gives unit portability. Write for Bulletin No. 487.

It's more profitable to handle ice for storage with G-W equipment. Conveyor speeds cakes from tank room to storage room, without manual handling — Up-Ender eliminates manual lifting to platform levels — Portable Tiering Machine stacks cakes fast, where you want them — Ice Tools assist where needed. Install this dependable combination in your plant and you've got big savings in time, labor . . . and handling costs. Write for Bulletins describing and illustrating these efficient Gifford-Wood machines, today.

FOR EXTRA PROFITS YEAR ROUND, USE . . . G-W ICE BREAKERS— A complete line of light, medium and heavy-duty breakers. Capacity—6 to 50 tons per hour depending on graded size desired. Four types of drum. Precision type has ribbed drum with curved picks—adjustable comb plates regulate ice particle sizes. Write for Bulletin No. 482.



And when you need SAWS be sure they're RIGHT ...get genuine G-W SAWS!

G-W ICE TOOLS — A complete line of top-quality hand-tools . . . tongs, hooks, shavers, bars, chisels, etc. . . . designed to make manual handling of ice easy and safe—made tough to stand the gaff for years. Write for Bulletin No. 480.

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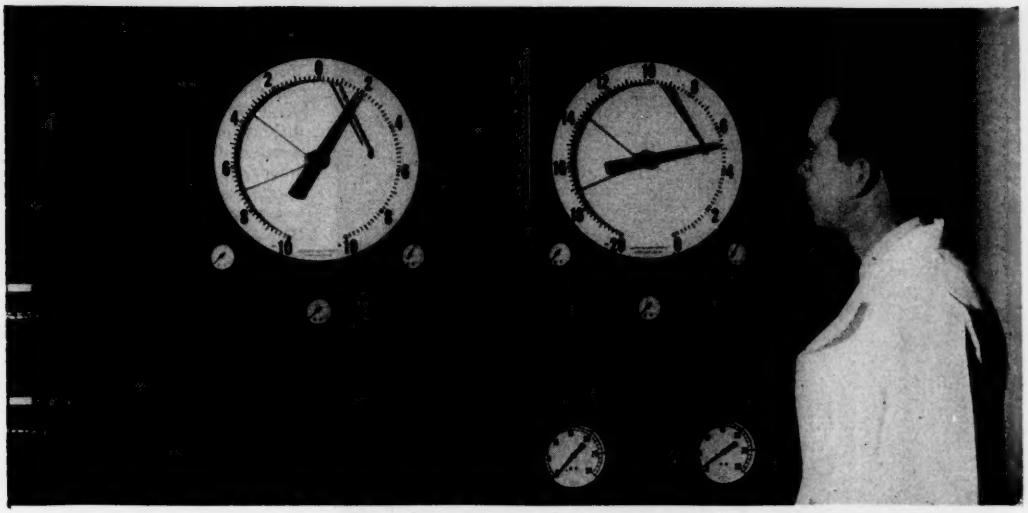


Panel board on which are mounted two resistance thermometer pneumatic controllers for (left) storage room and (right) processing room.

Controlled Refrigeration Provides Precise Fractionation of Blood Plasma

By Dr. R. B. Gochenour

Assistant Director Biological Laboratories
Pitman-Moore Co. (Div. of Allied Laboratories, Inc.)
Indianapolis, Ind.

BLOOD plasma proteins are a part of the long list of biological and pharmaceutical products made in the extensive plant of Pitman-Moore Company (a division of Allied Laboratories, Inc.) in Zionsville, Ind. Proteins from human blood plasma or from the plasma of hyperimmune animals such as the horse and rabbit are used by the medical profession to combat and cure such diseases as measles, pertussis, diphtheria, tetanus, and others less commonly known. In this article, the processing and storage room temperature controls used in this plant are described.

The processing of blood plasma is quite complex, principally because of the large number of chemical substances present and the difficulty of their separation. By carefully controlling temperature, pH, salt content, and other chemical and physical variables, some of the blood proteins can be separated by precipitation. By adding a substance or substances to the plasma and establishing a given set of closely controlled conditions, one or more components may be rendered insoluble. The material then is centrifuged at very high speeds to separate the insoluble substance or precipitate from the remaining liquid. This process may have to be repeated several times to obtain the desired protein fraction. Such a series of operations is known as fractional precipitation.

Temperature Determines Yield

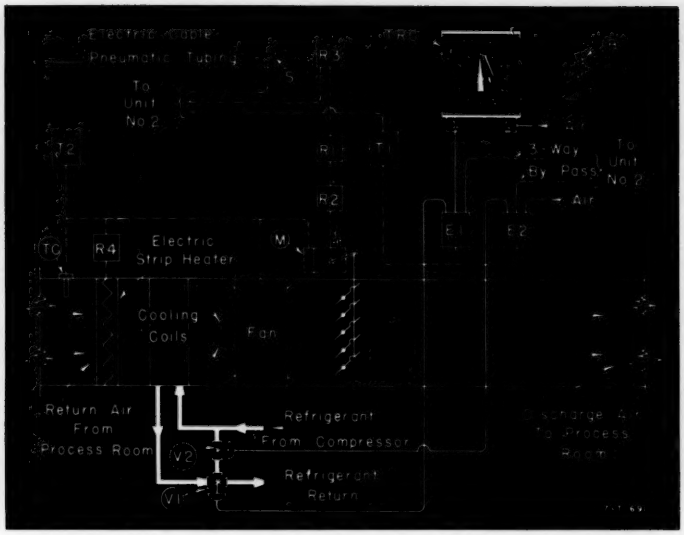
Precipitation operations are carried out in stainless steel or glass-lined vessels under precisely controlled temperatures. As illustrated, these vessels are located in large refrigerated processing rooms since in most cases it has been found easier and more effective to establish and maintain the processing temperature conditions in this manner than to resort to individually refrigerated vessels.

In general, precipitation occurs slowly, requiring several hours. A change of but one or two degrees Centigrade during the precipitation operation, or during centrifuging which follows, can spell the difference between a satisfactory yield of 80 per cent or more to a yield of only 20 per cent or less. A wider temperature variation can result in complete loss and, when dealing with a substance as precious and costly as human blood, such losses cannot be tolerated.

Dual Cooling Systems

The processing room is cooled by recirculating air discharged from the room over refrigerated cooling coils. Since processing temperatures are in the range of 0 to minus 20 C, refrigeration is required on a 24-hour basis all year long. This refrigeration is provided by an 8-ton Frick ammonia system. The entire installation which is

Minneapolis-Honeywell Regulator Co.



Refrigerating control system for Pitman-Moore process rooms (see text)

replete with signals and interlocking safety controls was designed and engineered by Hayes Bros., Indianapolis, Indiana.

In this installation, two full capacity cooling units alternately share the process load. By alternate operation of the units, the defrosting of the coils is simplified, and the wear and maintenance of the equipment are equally divided, providing greater long-term insurance against breakdown.

Resistance Thermometer Is Heart of Control System

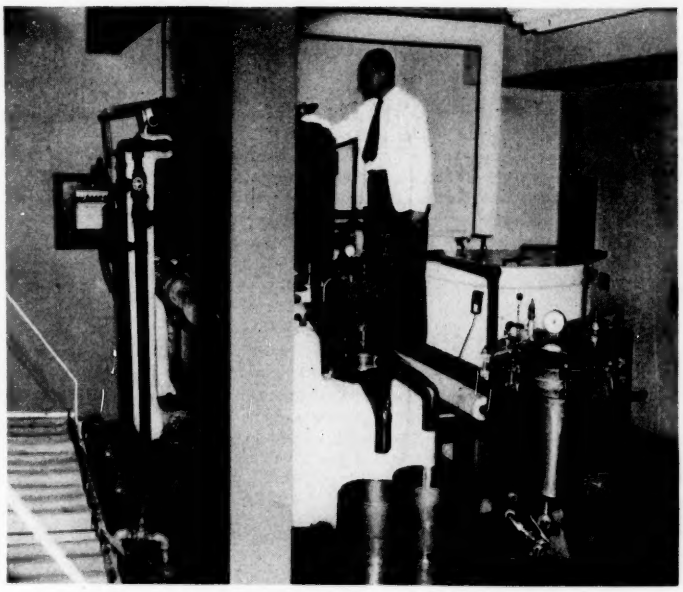
The process room temperature is measured by a nickel-wound resistance thermometer bulb located at a point most representative of the process space temperature. This bulb is connected to an indicating - recording *ElectroniK* instrument which is equipped with a pneumatic proportional-reset control unit. The instrument is calibrated from minus 20 to 0 C and incorporates a by-pass panel for convenience in shifting from automatic to manual control and vice versa. This instrument throttles a *Gradutrol* diaphragm motor operated three-way mixing valve in the refrigerant supply line to the cooling coils. The refrigerant is calcium chloride brine.

Two paths of refrigerant flow are possible through this valve. When in one extreme position, all brine supply will be passed through the cooling coils; in the other extreme position, all refrigerant will be by-passed around the coils. Normally, when the cooling unit is in operation, the mixing valve will assume an intermediate position, permitting just enough refrigerant to pass through the cooling coils to maintain the desired process room temperature. This valve and all other diaphragm motor valves on this installation are equipped with positioners to assure positive and accurate control action.

A master timer switches the load from one cooling unit to the other at intervals of six hours. Should the process room temperature rise over one degree above the set point during any given cycle, however, the system will automatically switch over from one unit to the other, thus providing maximum protection to the process. Defrosting of the cooling coils is accomplished automatically.

Operation of the Control System

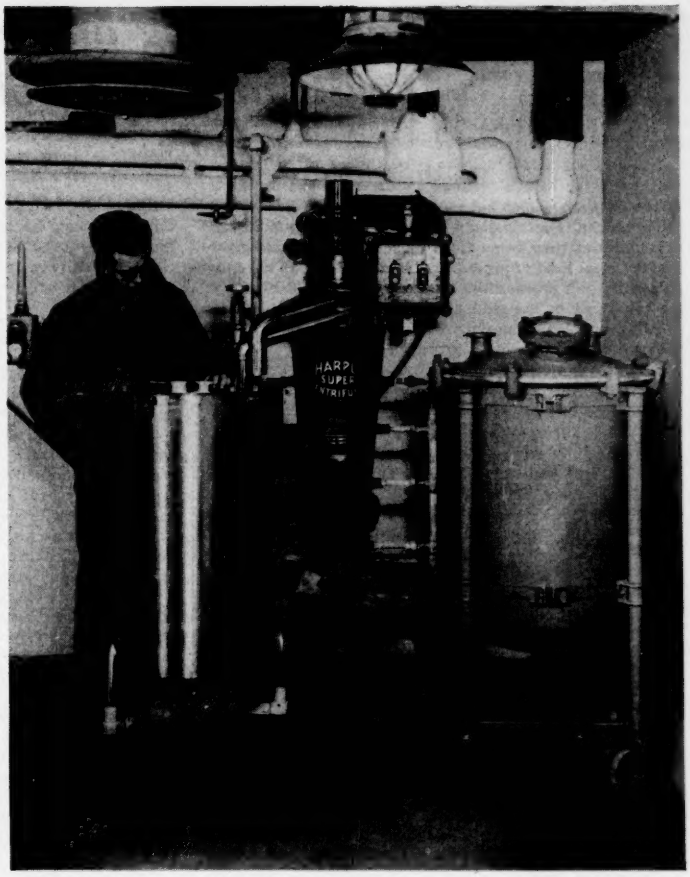
Some appreciation of the thorough manner in which the cooling control system was engineered so as to constantly maintain a processing temperature within plus or minus ¼ C and to provide maximum assurance against the costly consequences of equipment failure and inefficiency can be gathered from the accompanying schematic diagram. For simplicity, only one cooling unit, designated as No. 1, is shown. The other cooling unit is identical in operation.



Temperature-controlled super centrifuge for separating biological substances. Note ElectroniK potentiometer, equipped with mercury switch control, in background.

The process temperature is measured by resistance bulb *B* which is connected to *ElectroniK* controller *TRC*. Controlled air pressure from this instrument is connected to Honeywell electric-pneumatic relay *E-1*. Master timer *T-1* initiates switchover from one unit to the other at intervals of six hours. An electric impulse from *T-1* causes relay *E-1* to transfer the controlled air pressure from the three-way mixing valve on one unit to the other similar valve on the second unit. An impulse from *T-1* also causes electric-pneumatic relay *E-2* to reverse the operation of the valves in the refrigerant by-pass lines of each unit.

Assuming that unit No. 1 is carrying the refrigeration load, note that controlled air pressure from *TRC* will pass through *E-1* and will throttle three-way mixing valve *V-1*. The position of this valve determines how much refrigerant reaches the cooling coils and how much is by-passed. A slight temperature rise as sensed by bulb *B* will immediately be reflected in a change of controlled air pressure from *TRC*, causing *V-1* to permit more circulation of refrigerant to the coils and less refrigerant to be by-passed. The reverse action occurs on a slight temperature fall. When unit No. 1 is in operation, relay *E-2* permits supply air to reach diaphragm motor valve *V-2*, located in the by-pass line, keeping the valve and consequently the by-pass line open.



Interior view of temperature-controlled room where blood proteins are processed. For many products, it is easier and more effective to maintain temperatures in this manner than to employ individually refrigerated vessels.

When switchover occurs, *E-1* transfers the controlled air pressure from *TRC* to unit No. 2. Air is bled from the diaphragm of *V-1*, causing it to close the port on the return line from the coils. At the same time, *E-2* bleeds air from *V-2*, causing the by-pass line to close. Thus, with both lines closed, all circulation of refrigerant to or around unit No. 1 is stopped. Reverse actions of the valves on unit No. 2 occur, thus putting that unit into full operation. Also, when switchover occurs, *T-1* actuates electric relays *R-1* and *R-2*, causing *Modutrol* motor *M* to close the dampers on the outlet side of cooling unit No. 1 and to shut off the fan of this unit. *T-1* simultaneously actuates similar relays on unit No. 2 to cause the dampers of that unit to open and the fan to start.

Defrosting Controls

Defrosting of the cooling coils is accomplished automatically when a unit is switched off the load. On unit No. 1, timer *T-2* determines the length of time during which there will be application of power to the electric strip heater located adjacent to the cooling coil. This timer is adjustable from 2 to 50 minutes and its setting will be determined by the moisture content of the recirculated air. An auxiliary switch in motor *M* energizes *T-2* when the dampers of unit No. 1 are fully closed. A high limit temperature controller *TC*, adjustable from 40 to 105 C, acting through load relay *R-4*, will automatically cut off power to the strip heater should it exceed the predetermined high limit set point, thus providing protection to the cooling coils.

Emergency Switchover Controls

For maximum protection against exigencies of operation, the *ElectroniK* controller *TRC* is equipped with a mercury switch which is actuated instantly should the process temperature rise to the extent of one degree above the set point. Contact by the mercury switch energizes electric relay *R-3*, causing signal light *S* to give visible warning. Energizing of *R-3* also causes immediate switchover from one cooling unit to the other. This emergency switchover remains in effect until the process temperature again falls within one degree of the set point and until the push button is manually depressed. This latter action returns the cooling load to the unit with which difficulty was experienced.

(Continued on page 60)

Commercial Handling and Shipping of Fruits and Vegetables

By D. F. Fisher*

I HAVE been somewhat at a loss to decide how to approach this discussion. We might consider fruits and vegetables as they come fresh from nearby market growers, the ideal kind of produce we all would like to have and so seldom get, unless from our own backyard garden. Or, we can consider the shipped-in produce that comes from growing areas a thousand miles or more away, the kind that you find in the corner grocery store.

I think it is this shipped-in produce that will be of most interest not only because it represents the greater part of our supplies but also because it can be, and often is, better than locally grown stuff. This is not because it is inherently any better than local produce but because generally it is produced in a highly specialized area that is particularly adapted to that particular crop. Generally, too, the shipped-in produce is more strictly graded, whereas, all too frequently, the locally grown stuff is not graded at all but is just as it comes from the field. Most important, however, is the fact that the shipped-in produce generally gets prompt and adequate refrigeration which keeps it in good condition from field to market and right on to the corner grocery store, whereas the local produce is seldom refrigerated.

How fresh is this produce? Well, it depends on how long it has been picked or dug—how long since it was harvested, and the temperatures to which it has been exposed. For example, the thing about peas that we value most is not their starch content that gives them a high caloric value but that sweet garden-fresh flavor that precedes the development of starchiness. Do we stand a better chance of getting what we want in the peas grown nearby and trucked in to the local market, or in those grown in California and shipped 3,000 miles? It is possible of course to have good quality in the local peas if you get them soon enough after they are picked and if they can be kept cold, but I venture to say that you are more apt to find better quality in the California peas that ordinarily require 10 to 12 days to get to the consumer.

Here are some figures that show the importance of temperature on the sugar-starch ratio in peas. They are taken from Cornell Bulletin No. 599.

TABLE I.—SUGAR-STARCH RATIO IN PEAS BEFORE AND AFTER STORAGE AT DIFFERENT TEMPERATURES.

Temperatures Degrees F.	Time Stored Days	Sugar-starch Ratio
32	0	2.06
32	15	3.02
40	0	3.10
40	15	1.76
50	0	2.41
50	11	0.68
70	0	2.41
70	6	0.21

The rate at which garden peas become starchy and lose the fresh flavor that is their greatest palate appeal depends first, on the stage of maturity at which they are harvested, and second, on the temperature at which they are kept thereafter. As I have already stated, peas from California can be and frequently are of better quality than some locally-grown peas on Eastern markets because the shipped-in peas have been under ice constantly and the local produce has not been refrigerated.

Temperature Important

The importance of temperature in maintaining quality in fresh produce cannot be overstated. Not only is temperature extremely important in controlling diseases caused by fungi or molds, many of which will not grow outside of a certain temperature range, but it is vital in slowing down respiration and other metabolic activities associated with ripening and final deterioration in quality. The rate of respiration varies greatly with different products, being highest as a rule in leafy vegetables. Among fruits, strawberries and peaches have the highest rate, while grapes and oranges are among those with the lowest.

Some specific figures may be of interest. Take a carload of peaches, for example. If the peaches are at 60 F. when loaded and no refrigeration is used, the heat they produce in respiration will cause their temperature to rise to 85 F. inside of four days. If they were picked at the proper stage of maturity, this means that they will be overripe and doubtless a pulpy mess by time of arrival unless shipped only a short distance. Or, consider a longer-keeping fruit, like any of our winter apples. The respiration rate of apples at 40 F is about twice as fast as at 32; at 50 it is about twice as fast as at 40; at 70 it is again about twice as fast as at 50; whereas at 30, which is the storage temperature we recommend, it is about 25 per cent less than at 32 F.

This means then that for every day apples are kept at 70 F they respire 10 times as much as at 32 F. Since the rate of respiration is an approximate measure of the rate of ripening this boils down to the fact that for every day you hold apples at 70 F you cut off 10 days of their potential storage life at 30 F. So it should be readily apparent why we should provide proper temperature conditions for apples.

Transportation

In the transportation of fresh fruits and vegetables we have two general classes of products; (1) those that will tolerate low temperature and keep best at the lowest temperature that can be maintained above their freezing point, and (2) those that will not tolerate low temperatures and therefore keep best at moderately cool temperatures. Examples of the low temperature-tolerant products are all leafy vegetables, onions, carrots, beets, turnips, grapes, apples, and pears. Among the products that will not tolerate prolonged low temperatures are tomatoes, eggplants, cucumbers, potatoes, sweet potatoes, citrus fruit, pineapples, bananas, avocados, and mangoes. The first group is composed for the most part of products native to temperate climates, whereas those in the second group are largely of tropical or semi-tropical origin.

The problem in transporting these products is not lack of knowledge as to what temperature should be provided but rather how to secure and maintain that tem-

Paper presented at meeting of Nutrition Institute, March 31, 1949.

*Principal Horticulturist, Bureau of Plant Industry, Soils & Agricultural Engineering, U. S. Department of Agriculture, Beltsville, Md.

perature. This is because of the limitations of the vehicle we must use, whether it be truck or refrigerator car, and because we may want to use that vehicle in any one of three different kinds of protective services, that is, under refrigeration, ventilation, or heater service. It is not too much to say that present shipping practices and the facilities available do not provide ideal temperatures under any of these services but perhaps can come closer to it under refrigeration than under ventilation or heater service.

Keeping Cool with Ice

This is especially true when products can be shipped in actual contact with ice, or under "body icing" as we call it. By placing ice in the package with the product and then covering the load with crushed ice we can provide good temperature conditions for even leafy vegetables in hot summer weather. The principal precaution we must observe is to see that the ice used is not much colder than 32 F. because of the danger of freezing things with which it is placed in contact. Lettuce, for example, freezes at about 31.5 F. on the average. Ice used directly from the freezing tanks and that from storage rooms is likely to be much colder than this. We have records on ice being used at 17 F; and ice at 23-25 F. is not at all uncommon. So we recommend that the ice be allowed to stand until it begins to melt to make sure it is at a safe temperature for use. This is the type of transit refrigeration that is used with California lettuce and carrots and peas in the pod.

There is a great volume of traffic that is injured by being subjected to too cold temperatures. These products are very difficult to handle satisfactorily, especially under weather conditions that make the use of some refrigeration desirable, that is, when ventilation cannot be depended on to do the necessary cooling by admitting outside air during transit. It is a hard job to provide the intermediate temperature required for best results with most of these products (i.e., 50 to 55 F.), because the refrigerator car is designed to get things cold and keep them cold, and not to cool them just so far and no farther. Present methods of shipping these cold-sensitive products leave much to be desired, as I know you will agree if you have been buying sweet potatoes that turned black inside or tomatoes that would not ripen before they rotted, not to mention bananas that we all know now should never be put in the refrigerator.

Shipping Tomatoes

Now let us talk about tomatoes for a little while. I wonder what product you have in mind when tomatoes are mentioned. Is it the kind you grow in your own garden or pick up at roadside stands when you drive out into the country on Sunday afternoons in the summertime?, or is it the kind you buy at the store, 3 or 4 or 5 tomatoes all neatly wrapped up in cellophane? There is a good chance that you get the same variety in either case but to me they are not the same kind of vegetable.

I eat home-grown ripe tomatoes because I like them. The others I eat because it would not be polite or expedient not to, especially after my wife has gone to the trouble of fixing them into a salad. She says the tomatoes add color and make it look pretty, and besides are good for me. As a horticulturist, married 35 years to a home economist, I have long since learned to eat what is good for me. So I eat these off-season tomatoes, but without enthusiasm.

But if we are going to have tomatoes when the home-grown kind are not available we must get them from the South, or from Cuba or Mexico, depending on the season. To ship tomatoes to distant markets they must be picked before they are ripe. The demand for these tomatoes is so great that a tremendous trade has developed. Last year, for example, between November and June, inclusive, a total of 15,319 carloads of tomatoes moved to market in the United States. This was exclusive of the equivalent of over 6,000 carloads that were shipped by truck. They were grown mostly in Florida, Texas, and California. Besides these domestic shipments we received 1,094 carloads from Cuba and 11,917 from Mexico during the same period.

Tomatoes Shipped Green

That amounts to over 25 million pounds, enough to make a lot of colorful salads for unenthusiastic husbands. These off-season tomatoes are all shipped green. They are supposed to be mature, that is, full grown and at the stage where they are ready to begin to ripen. There is no precise way of telling whether they are in fact at this stage of maturity unless they show a tinge of pink at the blossom end. In general the trade does not want tomatoes to show that tinge of pink although in some places it is required. In consequence every shipment contains tomatoes that are more or less immature. Most of these can be ripened, but the quality after ripening depends primarily on the stage of maturity when picked.

The trade really has to have hard tomatoes to stand the long-distance shipment and handling necessary before they get to the stores, so we skip a lot of things that could be said about immaturity, packing, and shipping. We must regard the hard green tomatoes as necessary for the off-season deal. So it is entirely different from the summer or ripe tomato deal, which is primarily for the canning and tomato products industry.

The tomatoes which are hard and green when picked are hauled to a packing shed where they are washed, sorted, graded and sized by suitable machinery. Most of them are wrapped and packed like oranges in 30-pound lug boxes and these are loaded into refrigerator cars for shipment, 750 lugs per car. Nearly all go to special dealers in large metropolitan centers. Arriving at the dealer's place the lugs are unlidded, the tomatoes dumped into a machine that acts something like a huge vacuum cleaner and removes the paper wraps by suction and then rolls the tomatoes out onto a belt where they are sorted by color. Those that are judged to have enough color to go into the stores are packed immediately in the now familiar consumer-size units, and the others are put into ripening rooms and gone over every few days to get out the ones that meet color requirements, until finally all are packed, or have rotted meanwhile.

The rate at which the green tomatoes ripen or color depends first on the maturity and then on the temperature maintained during transit and in the ripening rooms. Tomatoes ripen best at about 70 F. To keep the tomatoes from wilting the atmosphere must be kept moist, at 85 to 95 per cent relative humidity. The repackers speed up or slow down ripening, depending on the supply at hand and the market demand. However, their operations are precarious because the conditions that they have to set up to ripen tomatoes are ideal for the development of rots, and they often have heavy losses on this account. This is especially so if the tomatoes have been exposed to low temperatures before being put in the ripening rooms, either before or during shipment.

At temperatures below about 55 F. there is no ripening but some of the rot organisms can make slow progress. The result is that when the tomatoes are put at ripening temperatures the rots have a head start on ripening and often

win the race. If the repacker tries to speed up ripening by raising the temperature above the optimum he usually speeds up the rotting even more or ends up with a tomato that turns yellow instead of red. Above 75 F. the red pigments do not develop in tomatoes.

But assume that he suceeds in getting his tomatoes colored, whether it is the pale pink we see all too often, or a good red which we would like to see. He then puts them in a cardboard tray and wraps them with cellophane and perhaps hides some of the defects so they look better than they are. Now he is ready to fill orders from the corner grocer, who buys what he thinks he can sell in a day or two at a time.

The eating quality of those tomatoes, none too good to start with, is influenced still further by the way they are wrapped up in these tight film packages. If the package is sealed the carbon dioxide from respiration soon builds up enough to stop further ripening, even at warm temperatures; and as the oxygen of the enclosed air is exhausted, bad flavors develop in the tomatoes. However, we have found that this is not necessary and that in packaging tomatoes they should not be shut up tight. It was not so long ago that the whole idea of prepackaging tomatoes was to use a moisture-tight film so as to keep them from wilting. We now know that small holes should be punched in the film to let the tomatoes breathe.

The point I have been trying to make is that tomatoes are not always just tomatoes; what they are depends on how we handle them and what we do with them. The same thing applies to potatoes. So now let us talk about potatoes, which probably are used more generally than any other single item in our diet.

Potatoes

I suspect that to most people potatoes are, just potatoes, and to some are a thing to be shunned because they are supposed to be fattening. Horticulturists know, however, as undoubtedly nutritionists do also, that it is not so much the potato as what we eat with it that does the fattening. But we know too that potatoes are not just potatoes. Some potatoes are good bakers and some are not. Some that are good bakers cook up into a mush when they are boiled. Some will fry into a cinder. Why do they do so?

Partly it is because of varietal differences. You all know about the Netted Gem or Russet Burbank variety. It is the typical "Idaho baker", but there is another variety that looks very much like this that is sometimes sold as an "Idaho baker." It is the White Rose. Both the Russet Burbank and the White Rose are grown in Idaho and if baked can be designated as "Idaho bakers;" but what a difference in the baked potatoes!—the one fine and mealy, the other wet and soggy. If you do not know varieties you may get fooled by the labels seen in the stores, or by the lack of labels.

Another case in point is the color of potatoes. I know people who have been surprised to learn that red potatoes are not neessarily new potatoes; for the earliest new potatoes from Florida are usually red. There are a dozen or more red varieties, and in some parts of the country it is hard to find any other kind on the market even in the winter. But it is not of varietal differences that I wish to speak. Let us take one variety and see what can happen to it during storage to affect its quality.

I wonder if you have not noticed that potatoes tend to be less mealy in the late winter than they are in the fall right after harvest. The reason is a change in the starch content. At time of harvest the potato has its highest starch content. After that some of the starch is converted to sugar, especially by low temperatures. The lower the temperature and the longer the potatoes are held at the low temperature the greater the conversion of starch to sugar and the more soggy they are when cooked. But in order to keep potatoes from sprouting for four months or longer we have to lower the temperature to about 40 F. Commercially we often keep potatoes even colder than 40 F. and for longer than four months.

Sugar accumulates in some varieties much more than in others. However, it is possible to reduce the sugar content and in fact to reconvert it into starch so that good quality is restored by transferring the potatoes to a warm room for a couple of weeks or longer, the treatment again depending on the variety. So here also the point I would make is that we cannot regard potatoes as just potatoes, or the same variety as always having the same quality, or properties. Cooking quality of market potatoes depends as much or more on how they were held after harvest than on any other single factor, variety and source included.

The quality of oranges too, is affected by the stage of maturity at time of harvest and how they are handled before reaching the market. As with tomatoes and potatoes, oranges cannot be regarded as an unvarying constant, like a chemical reagent. We can get oranges that are fresh from the tree and in their prime for eating quality. We can also get oranges fresh from the tree that are old and not particularly inviting to eat because they have been stored too long on the tree. We can get oranges that have been in cold storage for awhile and that taste either fresh or stale, depending on the temperature at which they have been held. We can also have oranges that have undergone a surprising number of beautifying processes that do not taste as good as they would if not put through the cosmetic production line. But the question is, would you buy oranges if they were not colored as you have come to expect oranges to be? It costs the orange industry a lot of money to apply the lip-stick and they would be quick to drop it if convinced they did not have to use it.

My main purpose in this discussion has been to suggest to those of you who may be doing analytical work of one kind or another on fruits and vegetables or who are trying to make precise measurements of their food value, some reasons for variable results that may puzzle you from time to time unless you go beyond a broad classification of your material as tomatoes or potatoes or oranges. Nor is it enough to go farther and say just Rutgers variety of tomato or Russet Burbank potato or Parson Brown orange, grown here or there, fertilized thus and so, or harvested at a particular date or stage. You may find the key to your difficulty in the conditions that prevailed after harvest. All of these things are living things, and the conditions under which they have to live, especially the temperature, have a profound effect upon their character and composition at any given time.

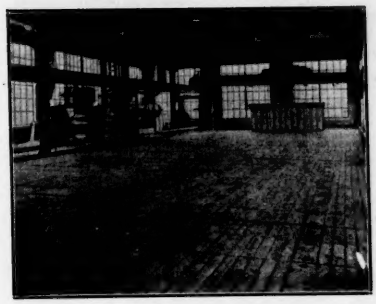
Candy Shops Add Air Conditioning

AIR conditioning has been added to the many new Loft Candy Shops located in subway stations of the New York City transit system. Both stockrooms and selling space of Loft subways stores are scientifically cooled by specially built five-ton Chrysler packaged units. They are engineered in such a manner that a system of ducts and grills extend from the stock room into the selling area. A constant temperature of 71 degrees for the stockroom and 74 degrees for the selling area is maintained.

In conjunction with expert air conditioning engineers, the Loft Construction Department worked out details of the cooling systems.

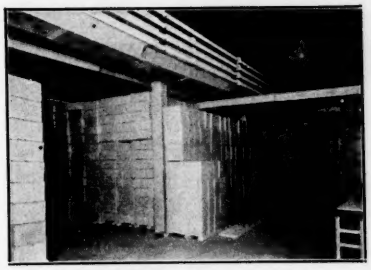
Community Refrigeration Centers Provide Breakdown of Sources of Income

By Terry Mitchell, M. E.
Frick Co., Waynesboro, Pa.



Ice Manufacture

Fruit Storage



Freezer Storage

Fur Storage

IN cases where ice plants have broadened their services until they became community refrigeration centers, the owners themselves have often been the people most surprised by results. Several such plants have found they made five times as much income, with the added services, as from the sale of ice alone.

In a recent survey, six typical community refrigeration centers were good enough to present figures showing the relative amounts of business obtained from each of the services they offer.

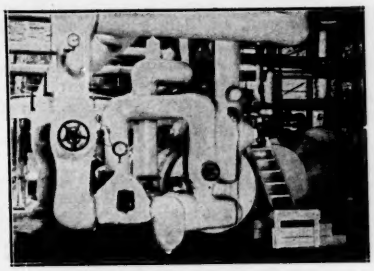
Pennsylvania Plant

The first of these plants, located in Pennsylvania, is obtaining 20 per cent of its revenue from the ice-making department, 32 per cent from lockers, 20 per cent from long-and short-term storage, 12 per cent from quick-freezing, and 16 per cent from other services. This plant has one of the largest locker systems in the state, and is also doing extensive quick-freezing work, in a way that has attracted visitors from all over the country.

Georgia Plant

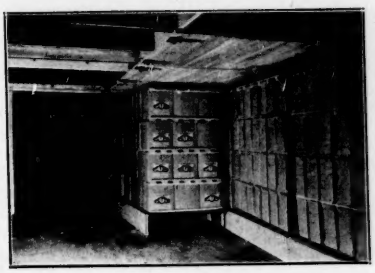
The second plant, located in Georgia, does 15 per cent of its business in lockers, 9 per cent in quick-freezing, 1 per cent in storage operations, and 75 per cent in the sale of ice. These operations constitute only half of the total gross revenue, the rest being divided equally between the sale of coal and of miscellaneous appliances, such as refrigerators, home freezers, electric ranges, sinks, washing machines, pumps, and heaters. The locker services include chilling and ageing meats, cut-

Railway Car Icing



Pipe Line Refrigeration

Lockers



Quick-Freezing

ting, wrapping and quick-freezing, slicing, lard rendering and hulling peas and beans. This plant is under very progressive management and is constantly growing.

Second Pennsylvania Plant

Plant No. 3, also in Pennsylvania, is one of the earlier community refrigeration centers. It now does 21 per cent of its business in ice, 7 per cent in lockers, 14 per cent in short-term storage, 52 per cent in long-term storage and 6 per cent in other services. Some 1200 lockers are rented here; the freezer space totals over 10,000 cubic feet, and there is storage for 100,000 bushels of apples. An adjoining packing house handles up to 1,000 bushels of fruit a day, and is specially equipped for processing cherries, strawberries and raspberries. Another department is a slaughtering plant where 200 head of calves and sheep can be handled per day. A brand new department makes dog-and-cat food on a large scale.

Utah Chain of Plants

A chain of plants in Utah has expanded its services until only 54 per cent of its business now comes from the sale of ice. Short-term storage accounts for 32 per cent, lockers for 6 per cent, long-term storage and quick freezing another 6 per cent between them, and other services were 2 per cent. Ice provides such an important part of this firm's work because it does a great volume of car-icing work. The company also pioneered with frozen foods in the Intermountain area.

West Virginia Plant

West Virginia has a community refrigeration center which offers practically every commercial refrigeration service possible except quick-freezing. Ice accounts for 71 per cent of its business, lockers for 1 per cent, short-term storage 4 per cent, long-term 10 per cent, freezer storage 6 per cent, and other services 8 per cent. This plant makes 150 tons of ice a day, a fourth of which is sized. It has separate fur and rug storages, operates pipe lines leading to the meat cooling rooms in a nearby building, and handles a wide variety of other food products. Its plant covers about a city block.

Third Pennsylvania Plant

Another Pennsylvania plant divides its business as follows: ice, 20 per cent; lockers, 18; long-term storage 47; short-term storage, 4; freezer storage 6; and other services, 5. A special service in this case includes furnishing refrigeration through pipe lines to an adjoining ice cream plant. The long-term storages are chiefly used for apples. Upwards of 3000 lockers are rented.

The community refrigeration center idea is attracting attention in overseas countries as well as throughout the United States. Those ice plants which pioneered in developing a wide range of services have found them very much worth while, and would not consider abandoning these extra activities. Others interested should lay out a long-range plan of expansion. The opportunities in this direction have been scarcely touched, in most places.

Properties of Concrete Made with Light-Weight Aggregates

SINCE the first World War, a wide variety of lightweight materials, both natural and processed, have been introduced and marketed as concrete aggregate. To obtain the engineering data needed for studies concerned with the manner and extent to which lightweight aggregate concrete may be useful in the present building program, an investigation was undertaken jointly by the National Bureau of Standards and the U. S. Bureau of Reclamation. Results of the research at the National Bureau of Standards show that it is possible to make concretes of low cement content with excellent workability, sufficient strength, and adequate heat insulation for certain applications in building construction.

During both world wars, lightweight aggregate concretes were used to a limited extent as substitutes for the materials commonly employed in the construction of barges and ships. Lightweight materials also have been found advantageous for the floor construction of some of the World's greatest bridges, and as both the fireproofing and the structural concrete in multi-story buildings resting on foundation materials of low-bearing capacity. However, the available supply of cinders and the expanded clay, shale and blast furnace slag aggregates has been absorbed by producers of concrete building blocks. The use of the lighter aggregates has been limited principally to concrete for thermal insulation and for roof and floor fillers.

NOTE: For further technical details on this subject see "Some Properties of Lightweight Aggregate Concrete" by R. D. Kluge, M. M. Sparks, and E. D. Tuma, May 1949, Journal of the American Concrete Institute.

Fig. 1—Resistance of lightweight aggregate concretes to freezing and thawing cycles is determined in this specially designed refrigerator at the National Bureau of Standards. The specimens, prepared as part of an extensive investigation of the structural and insulating properties of this type of concrete, are first cooled to a temperature of minus 50 F. and are then thawed by immersion in a water bath at 60 F. This test simulates the extreme weather conditions to which concretes in service may be subjected.

For some structures, the possibilities of economies resulting from a reduction in the weight of the concrete are apparent, notably for tall buildings constructed on soft foundations and for structures designed to resist strong earthquake forces.

The studies at the National Bureau of Standards were limited to one sample of each type of aggregate material, except for three samples of slag. The investigation was also restricted to plastic concrete as distinguished from pressed or tamped concrete as used in concrete masonry units.

Aggregates Included in Study

Eleven lightweight aggregates (described in Table I) were included in the Bureau's study. These consisted of exfoliated vermiculite; two processed materials, sintered diatomite and fly ash; expanded perlite, blast-furnace slags, shales, slates, and clays; and one natural material, pumice. The samples of expanded slate and expanded clay were furnished for experimental purposes by the Bureau of Mines, College Park Station; the other nine were commercial products. For comparison, Potomac River sand and gravel were also included and treated in the same manner as the lightweight aggregates.

The investigation at the Bureau consisted of two parts: (1) Tests concerned with the properties of the aggregates themselves and (2) tests to determine the properties of concrete containing various proportions of cement and aggregates (Table II). Because of the angular character of the individual particles and their peculiar absorptive properties, techniques for testing, proportioning and mixing the aggregates differed somewhat from those used for the ordinary natural dense aggregate mixtures.

The proportions of cement to aggregate were such as to produce concrete mixtures from each aggregate containing nominally 3, 5, 7, and 9 bags of cement per cubic yard of concrete. The consistency of each batch of concrete was measured by means of the standard slump test. Test specimens were prepared in triplicate except for the compressive-strength and the thermal-conductivity tests. Five like specimens were used for the former and one for the latter.

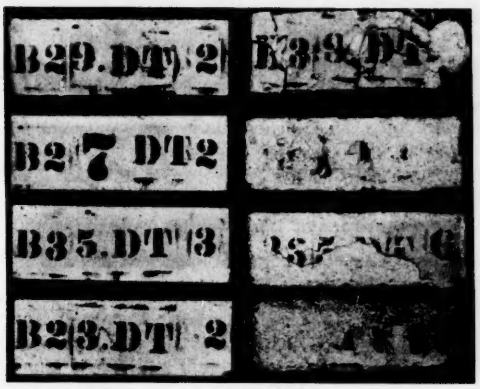


Fig. 2—Photograph showing the effect of freezing and thawing on one of the lightweight aggregate concretes included in the National Bureau of Standards investigation of the properties of such concretes. The aggregate used in these specimens appeared to be especially vulnerable to the freezing tests since it required only 3 cycles of freezing and thawing to cause the deterioration shown at the right of the photograph. The specimens to the left are 9-, 7-, 5-, and 3-bag concretes, respectively, as they appeared before testing.

Air Entrainment

Air entrainment was found to assist materially in promoting workability of the concretes made from lightweight aggregates. Such entrainment of air enabled the cement

TABLE I. DESCRIPTION OF LIGHTWEIGHT AGGREGATES TESTED

Aggregate	Description
Exfoliated vermiculite	A type of mica which has been expanded by the action of heat. The particles were soft and fragile and had flaky laminated structures. Color, brown to buff with metallic luster on laminated surfaces.
Sintered diatomite	A processed diatomite which had soft chalky particles. Color, light tan to light pink.
Perlite	An expanded perlite composed of frothy particles which were fragile and irregular in shape. Color, white.
Expanded slag No. 1	A slag expanded in the pit process. The particles were irregular, the relatively large cell structure creating a rough surface texture. Color, light to dark gray.
Expanded slag No. 2	A slag expanded from runner. Similar in surface characteristics to expanded slag No. 1. Color, almost black to light gray with occasional cream-colored particles.
Expanded slag No. 3	A machine-processed expanded slag. Similar in appearance to expanded slag No. 2. Color, uniformly cream colored with only an occasional gray particle.
Sintered fly ash	A processed material resulting from the combustion of powdered fuel to steam power plants. Similar in appearance to ordinary cinders, extremely rough and irregular in shape. Sample contained numerous black glass particles. Color, dark brown to black.
Pumice	A natural lightweight material of volcanic origin. The particles contained uniformly small cell structures. The surfaces were fairly soft and granular in texture. Color, off white.
Expanded shale	A shale expanded by heat. The particles were angular but not sharp or rough. The internal structure was smaller, with more uniformly sized cells than the expanded slags. Color, uniformly medium gray.
Expanded slate	A slate expanded by heat with fairly well-rounded and reasonably smooth particles of laminar structure. Material produced experimentally by the Bureau of Mines, College Park Station. Color, buff to brown.
Expanded clay	A clay expanded by heat with well-rounded and fairly smooth surface and uniformly small cell structure. Color, tan to gray. Material produced experimentally by the Bureau of Mines, College Park Station.

and water to remain in suspension throughout the mass of the concrete whereas without the air, ingredients would have segregated. The entrained air also acted as a lubricant, allowing the concretes to flow readily into the forms with a minimum amount of puddling or vibrating. Though it had a small effect in reducing the weight of concrete, the entrained air was found to be greatly beneficial as a means of increasing resistance to disintegration by freezing and thawing.

The lightweight concretes investigated ranged from one-fifth to three-fourths of the weight of ordinary sand-and-gravel concrete. The density, which varied with portland-cement content, ranged from less than 50 lb. per cu. ft. (vermiculite and perlite) to 110 lb. per cu. ft. Sand and gravel concrete weighs about 145 lb. per cu. ft. The range between 70 and 110 lb. per cu. ft. included the pumice, slags, sintered fly ash and expanded clay, shale and slate aggregate concretes.

TABLE II. TYPES OF TESTS FOR AGGREGATES AND CONCRETES

Aggregate	Concrete
Sieve Analyses	Compressive strength
Specific gravity	Flexural strength
Absorption	Shrinkage
Unit weight	Absorption
Grading (mechanical analysis)	Elastic modulus—static, dynamic
Crushing strength	Resistance to freezing and thawing
	Thermal conductivity

The compressive strength of air-dried concretes, tested at 28 days, was markedly affected by the amount of cement in the mix. Considering 5-sack-per-cubic-yard proportions, compressive strength of the concretes ranged from less than 300 lbs. per square inch for those with vermiculite and perlite aggregate to approximately 5000 lbs. per square inch for that with sand and gravel aggregate. The majority of the lightweight concretes gave compressive strengths between 700 and 2500 lbs. per square inch. The 7-sack mixes were materially stronger ranging up to 6000 lbs. per square inch for expanded shale.

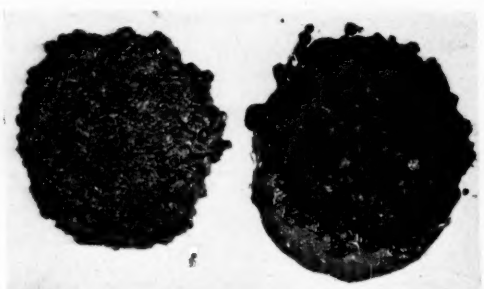


Fig. 3—Photograph showing the effect of air-entrainment agent on harsh lightweight-aggregate mixtures. Air entrainment was found to assist materially in promoting workability, as well as reduce the weight, of the concrete made from these aggregates. These two samples of fresh concrete contain identical proportions of cement, aggregate and mixing water. The sample on the left contains, in addition, approximately 0.05 percent organic air-entraining agent by weight of cement. The cohesiveness and the ability of the air-entrained mixture to retain water is evident, whereas serious segregation and bleeding are apparent in the other mixture.

Porosity of Concrete

As might be expected, the porosity of the concrete was found to increase as weight decreases, ranging from 50 per cent of water absorbed by volume for a 3-sack mix of vermiculite concrete (28 lb. per cu. ft.) to 7 per cent for a 9-sack expanded clay (100 lb. per cu. ft.). The corresponding absorptions by weight were approximately 118 and 4 per cent respectively. With very few exceptions, porosity increased with decrease in cement content. Use of air-entraining agents and increase in cement content improved durability of all concretes.

The coefficients of thermal conductivity (k values) range from 1.7 to 2.4 Btu/hr/ft^2 (°F/inch) for the pumice concretes tested at the National Bureau of Standards as compared with values of 6.7 to 9.6 for sand and gravel concrete. Still lower k's (0.75 to 1.6) were measured on the vermiculite and perlite concretes. These two materials represent the extreme in light weight but have the consequent drawbacks of low strength and high porosity with related uncertainty of behavior under weathering unless protected. However, their low density and very low heat conductivity provides a great field of usefulness where strength is unimportant. The slags, expanded clay, shale and slate, sintered fly ash and pumice are intermediate in their properties and can be used in place of conventional sand-and-gravel concrete except where extremely high strength is required. The lower thermal conductivity and lighter weight of these materials are advantages in practically all constructions.

The Bureau's investigations showed, in summary, that concretes, weighing as little as one-fifth the weight of ordinary concrete, are possible using lightweight aggregates. Though these extreme lightweight concretes developed little strength, thermal conductivities as low as one-tenth that of sand-gravel concrete were exhibited. Other lightweight-aggregate concretes developed compressive strengths between 1,000 and 7,000 lbs. per square inch, and weighed approximately one-third to two-thirds as much as sand-gravel concrete. Their thermal conductivities when dry were of the order of one-fourth to one-half those of ordinary dense concrete. Most lightweight aggregates had relatively high water absorption, and shrinkage of the concretes made with them was approximately two or more times that of dense aggregate concrete. Except for lean 3-bag mixes, lightweight concrete containing air-entraining agents, in general exhibited remarkable resistance to laboratory freezing and thawing tests of a rather severe nature.

Economics of Lightweight Aggregate

At present lightweight aggregate concretes cost considerably more per unit of volume than concretes made from the readily available dense aggregates. Therefore, from an economic viewpoint the use of lightweight aggregate concrete cannot be justified unless there is some off-setting saving. The saving may result simply from the reduced loads that must be carried by the structural members, or it may result from the utilization of the heat insulation properties to eliminate another more costly material. To achieve lightness and good heat insulation value it is necessary to tolerate a relatively low strength, high absorption, and large shrinkage, since light weight, good thermal insulation, high strength, and small shrinkage cannot be attained in a single concrete. Nevertheless, there is good reason for believing that lightweight aggregate concretes will be used more extensively in the future.

Jailing the Portable Electric Tool Killer

By A. L. Shepler

Safety Engineer, Westinghouse Electric Corporation, East Pittsburgh, Pa.

MAN through the years has developed many things which have become his servants because he has been able to keep them under control. One of these servants—and who would want to live without it today—is electricity. Familiarity, it is said, breeds contempt. So it is with low voltage electricity. Most people are either contemptuous of or unfamiliar with the killing power of 110 volts.

I shall limit my remarks to one small part of the problem—that of controlling the potential hazards in the use of portable electric tools commonly found in industrial plants —tools like the grinder, drill, saw, etc. These tools are man's servants so long as they are controlled. If uncontrolled they can be deadly killers—killing through low voltage electric shock.

Now can we jail these killers? Can we take them out of circulation? We cannot do that of course, but we can control them and still have them serve us well. Let me tell you of a program which works; one which has produced results.

Control a Simple Process

Control of portable electric tool hazards is a relatively simple thing. Control is maintained through three fundamental approaches: (1) Proper grounding equipment, (2) scheduled inspection and maintenance, and (3) constant education. Let me develop each of these for you.

First, this is what we mean by proper grounding. Instead of the conventional two wire system of cable and receptacle all outlets and cables are of the three wire type; the third wire being the ground wire. Each receptacle box is fitted with a receptacle into which a three point polarized plug can be inserted. The third point is attached to a ground wire which is a part of a standard rubber covered cable. In the receptacle the ground wire is attached to the box which of course is tied into the conduit. The conduits in turn are effectively grounded. The standard extension cord is a three wire cable with a combination lighting socket and three wire receptacle on one end. It serves as an extension light and a grounded receptacle into which a portable tool may be plugged.

Converting a large plant to this system was quite an undertaking. It was done by first making a survey of the facilities and then making an engineering estimate of the money involved. Management agreed to the expenditure in the interests of safety. The cost (several years ago) averaged about $1.85 for each wall receptacle and a little less than $3.00 each to change over the plugs and cables on tools.

Converting the equipment thus made it unnecessary to depend on each workman attaching a ground wire each time he had occasion to use a portable tool. All he had to do was plug in the cord and the grounding was set up for him. It was "built in."

The second part of the program—that of inspection and maintenance had been in effect long before the change over to the three wire system. It works like this: When a portable electric tool is purchased it is visually inspected and subjected to an insulation test, a serial number is stenciled on the tool and a card record set up for it. On this card is the small tool number, its description and the date it was issued. Also shown is the name, location and check number of the person to whom the tool has been issued. A double column is provided in which "date in" and "date out" are recorded to indicate dates tool was inspected and tested. The tool room arranges, from this record, to call in each tool once each calendar month for inspection and insulation test.

Each tool is inspected for mechanical and electrical defects. The insulation test consists of an electric test of 500 volts to ground. To perform this test a small type transformer, 110 volts to 500 volts is used. In order to assure safe testing a foot switch designed as a dead man control is cut into the primary side of the circuit. If the operator receives a shock for any reason and falls, the depressed switch is released and the circuit opens. Rubber covered leads on the end of which are retractable metal points encased in hard rubber (insulated) handles are used as test leads. A red light is wired into the circuit in such a manner that it remains lighted as long as there is no ground existing.

If, during the test the light goes out, this indicates the existence of a ground in the equipment, or a short between the test points. The tool is then disassembled and the trouble corrected. It is worth noting that some failure may be close at hand but has not shown up in use where the voltage was 110 volts. The 500 volt test circuit causes the weakness to become an immediate failure. It therefore occurs during test rather than happens when the tool is in use.

It is interesting to note that when the 500 volt test procedure was put into operation quite a number of tools failed under test. These same tools had been passed when tested with 110 volts. After these were weeded out the incidence of failures did not seem much greater than they had been when tested at 110 volts.

It is the safety department's responsibility to check from time to time and see that the inspection schedule is being followed. If this procedure is followed defects are often found before they become serious and adequate repairs and maintenance is possible.

In spite of efforts to make and keep equipment in safe condition it is felt that education cannot be forgotten. In the third part of the program educational methods fitted to the situation are used. Through supervisors, groupleaders and safety observers a continuing educational program is carried out. A fair share of attention is given to low voltage electric shock and the hazards which might produce shock. Proper use of portable tools is stressed. In addition a fair percentage of employees are periodically trained and rechecked in artificial respiration technique so that they may be prepared to render first aid in the event of electric shock.

The question may arise—does this program pay off? A search of the accident record covering the past ten years revealed that there has not been a single serious injury or fatality due to low voltage electric shock. That record, in a plant employing an average of 15,000 hourly people, working more than 42,000,000 man hours each year is proof, we think, that the program has been worth while.

A program built around proper grounding, scheduled inspection and testing, and continuing education will do much to remove the potential hazards in the use of portable electric tools.

Presented to the 35th National Safety Congress.

Refrigerated Warehousing Industry

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Division of American Warehousemen's Association

Executive Offices:
Tower Building, Washington 5, D. C.

Secretary, W. M. O'Keefe
Executive Vice-pres., Wm. Dalton

President, Arthur N. Otis
New York, N. Y

Vice-president, Fred F. Alford
Dallas, Tex.

Treasurer, J. L. Gagini
Omaha, Nebr.

Warehouse News—Annual Convention Planned—Food Groups to Hold Public Relations Forum

THE American Warehousemen's Association and its two divisions, The National Association of Refrigerated Warehouses and the Merchandise Division, are now beginning to work out details for the 59th AWA Annual Meeting to be held at the Edgewater Beach Hotel in Chicago, January 30-February 2, 1950.

A committee of arrangements consisting of W. C. Castle of Currier Lee Warehouses, Inc.; A. F. Winston, Fulton Market Cold Storage Co., Co-Chairmen; S. T. Heffner, North Pier Terminal Co.; F. D. Bateman, Griswold & Bateman Warehouse Co. and W. C. Baker, Produce Terminal Cold Storage Co. was recently appointed. The committee held its first meeting to discuss preliminary plans on August 2.

The usual order of the AWA General Sessions will probably be varied somewhat at this convention in order to permit the NARW members to attend the General Session of the National Association of Frozen Food Packers convention on Thursday, February 2. The tentative plans call for the AWA Closing General Session to be held at a luncheon on Wednesday, February 1, instead of after adjournment of the Divisional Sessions as previously planned.

A letter from AWA General President, C. D. Johnston, formally announcing the convention will shortly be released to the AWA membership, along with necessary hotel reservation forms.

Food Group Formed

SOME 75 executives of Washington trade associations representing food and allied industries have formed an organization to be known as the Food Group. This group will hold regular luncheon meetings twice monthly to discuss problems of mutual interest and to hear informal talk on the subjects of importance to food industries.

The first formal meeting of the group was held on July 19 at which an interesting and informative talk was made by Col. Stanley Andrews, head of the Office of Foreign Agricultural Relations of the U. S. Department of Agriculture. Col. Andrews, who had just returned from a tour of several European countries, discussed the agricultural and food outlook in Europe.

At the same meeting, the following officers for the Group were elected: Chairman, Raymond E. Steele, National Fisheries Institute; Vice President, William Dalton, National Association of Refrigerated Warehouses; Treasurer, Geraldine Walsh, Milk Industries Foundation; and Secretary, Joseph R. Cavanagh, American Institute of Food Distribution. These officers and Robert J. Wilson, National Restaurant Association, Harold O. Smith, Jr., U. S. Wholesale Grocers Association and Lawrence S. Martin, National Association of Frozen Food Packers, comprises the Group's Executive Committee.

A public relations forum will be sponsored at the Mayflower Hotel in Washington on October 5. This forum will be an all-day affair consisting of morning, luncheon, and afternoon sessions. The purpose of the forum will be to discuss the public relations activities of trade associations and problems confronting trade association executives in conducting these activities.

The committee on arrangements for this forum consists of William Dalton, National Association of Refrigerated Warehouses, Chairman; Richard B. Hall, Public Relations Society of America. Other committee members are: Robert K. Harper, National Business Publications, Robert North, International Association of Ice Cream Manufacturers, and Walter Swanson, National Highway Users Conference.

Dalton Goes to School

WILLIAM F. DALTON, executive vice-president National Association of Refrigerated Warehouses, went back to school during August. He attended the Trade Association Institute at Yale University for one busy week. This is a special intensified course in trade association management, especially arranged for trade association executives, which gives them an opportunity to keep ahead in the field of fast-moving present-day business and trade developments.

Executive Committee Meeting

THE third quarterly meeting of the Executive Committee, National Assoiation of Refrigerated Warehouses, will be held at the Edgewater Beach Hotel, Chicago, Friday and Saturday, October 7 and 8. Members of the association are invited to submit subjects to be included in the agenda.

Wisconsin Warehousemen's Association, Annual Meeting

THE 1949 annual meeting of the Wisconsin Warehousemen's Association was held at the Milwaukee Athletic Club on July 28 with a majority of the membership represented. The meeting began at 10:00 a.m. and concluded at 5:30 p.m., with a group luncheon and refreshments at noon.

Speaker at the luncheon was Ray Niemitz, manager of the Research Department of the Milwaukee Association of Commerce. Mr. Niemitz summarized the opinions of research men of the nation and expressed an optimistic view of the future. We are not in a depression, he said, and the business recession we are in has about reached bottom.

Officers Elected

The following officers were elected:

President, R. J. Laubenstein, Leicht's, Green Bay.

Secretary, Harry Pratt, National Terminals Corp., Milwaukee.

Treasurer, E. F. Homuth, Anchor Transfer & Storage Co., Fond du Lac.

Vice-Pres. Cold Storage Division, Howard Fabian, Central Storage & Warehouse Co., Madison.

Vice-Pres. Merchandise Division, H. M. Willenson, American Warehouse Co., Milwaukee.

Vice-Pres. Household Goods Div., Henry Melius, Boulevard Fireproof Warehouse, Milwaukee.

Report on Tax Exemption

Philip G. Kuehn of the Wisconsin Cold Storage Co., gave the meeting a detailed report regarding the two bills passed by the recent legislature with reference to personal property tax exemption on goods stored in Wisconsin warehouses. Because the corrective bill, sponsored by the association, had not yet been signed by the governor, it was decided that a special statement to members of the association on this question would be issued.

Mr. Kuehn gave a detailed history of the legislation covering this question. He explained that Wisconsin enacted a law in 1927 which exempted merchandise in warehouses if in original package. Two years later the Supreme Court held that this law applied only to goods from outside the State of Wisconsin and that goods orginating in the State of Wisconsin were subject to tax. This situation prevailed from 1929 until the recent legislature enacted an amendment designed merely to clarify and bring up-to-date the old law but it contained wording and was in language that some of the assessors interpreted as eliminating the old exemption.

(In a later communication to members on this subject, it was explained that the committee of the association on the personal property tax question brought this subject to the attention of the legislature and just prior to its adjournment, the legislature passed an amendment to the law at the request of the committee which clearly replaced the exemption that some of the assessors thought had been removed. The amendment was passed by the Senate and Assembly, was signed by the governor on July 29 and became law on July 30.)

President Talks

In his opening remarks, president T. L. Hansen cited the work accomplished on the personal property tax legislation as an outstanding example of what can be accomplished by united industry effort. He also cited this legislative situation as an example of the need for close and continuous contact by warehousemen, and all business men, with their members in both the State Legislature and the National Congress. He expressed the opinion that there is and will continue to be a need for business to tell its side of the story to all law makers, and that they want to know views of business men. Mr. Hansen also emphasized the advantages of mechanized handling of warehouse storage. Conversion to mechanical handling, he said, had proved a great time and money saver in his house.

Cold Storage Volume Declines

Vice-president James Kuehn, of the cold storage division, reported that cold storage volume was declining with the decline in food prices, although Wisconsin average occupancy is above the national average. He quoted the national averages on occupancy at 58 per cent of freezer and 63 per cent of cooler while Wisconsin has 73 per cent of freezer and 65 per cent of cooler.

All branches of the industry in Milwaukee reported that the five weeks strike of warehouse workers earlier this year had had no serious effect on business. Customers, they said, were inclined to be tolerant of the inconveniences resulting.

Wilson Little, executive secretary of the American Warehouseman's Association, was a guest at the meeting and he, too, emphasized the great value to the warehousing industry of contacts by warehousemen with their members of Congress. He reported that the industry had successfully met two important issues in this session of Congress.

Howard Fabian, chairman of the association's Committee on Licensing Standards, reported that his committee had submitted to the Department of Agriculture at Madison the recommendations approved by the association relative to warehouse licensing in Wisconsin. He stated that the recommendations were now before E. F. Sears for consideration, announcing that Mr. Sears had succeeded C. W. Wilson as head of the warehousing division of the Department.

Harry Pratt, of the National Terminals Corporation, Milwaukee, presented a tentative set of working rules for warehouse employees, as prepared by a committee of the Milwaukee Warehouseman's Association. He stated that as soon as the Milwaukee group had definitely approved this set of rules, copies would be made available for distribution to members of the state association. Warehouses having union agreements will find these rules of interest and value, he said.

Reporting for the insurance committee, E. H. Ottman, chairman, said the question of adequate insurance coverage and the premium for such coverage should warrant considerable attention by the management of all business operations. He suggested that the association should plan and provide some means for bringing to the attention of the association's secretary such information as may affect the statutes in the way of new legislation or changes to the old, which changes might then be promptly considered as to what affect they might have on the warehousing business.

A. L. Fischer, chairman of the Ports and Terminals committee, gave a detailed report on the city wide warehouse strike in Milwaukee which lasted from May 17 to June 20. This strike, he said, affected not only warehousing operations at inland warehouses but waterfront warehouses as well. There was a complete cessation of stevedoring during the strike and the amount of traffic which was lost because of the strike was considerable. Its termination resulted in a longshore wage agreement under which a basic increase of 5 cents an hour was agreed to.

Port Terminal Developments

With the completion of this labor problem, Mr. Fischer suggested that port terminal operations join in the planning for current and future developments of port services and facilities. He suggested the feasibility of planning future port developments on a sound economic foundation to the end that they will keep pace with progress consistent with the public interest and necessity, with due regard to the rights and objectives of private enterprise.

In this connection, he said, the formation of the Calumet Harbor Terminals in Chicago is a noteworthy achievement. This brings together a group of men who have been prominently identified in the warehouse, shipping and transport business in a new water, rail and truck terminal operation on the south side of Chicago in what is known as the Calumet Lake location on the extensive property developed by the U. S. government during the war. Mr. Fischer characterized this as a development of far reaching importance and portends a major concentration of waterborne traffic from barges, lake boats and ocean ships.

Poultry Display to be Shown at Fact Finding Conference

OVER 80 per cent of the exhibit space for the Mid-Century Fact Finding Conference was sold and assigned July 11th during the first space allotment, and additional requests are being received daily, according to Dr. Cliff D. Carpenter, president of the Institute of American Poultry Industries, sponsor of the annual event.

The latest in poultry and egg production, processing, packaging and marketing equipment, supplies and services will be on display during the four day meet, February 11-14 in the Municipal Auditorium, Kansas City, Mo. A feature of the exhibit will be a comprehensive historical display of "the poultry industry in 1900" and a comparison with developments of 1950.

"With previous exhibitors reserving more space and a number of companies showing for the first time," said H. Lee Campbell, Exhibit Manager, "the 1950 lay-out requires 24,000 square feet of exhibit floor, 25 per cent more than 1949.

More than 1500 people who produce, hatch, feed, process and market poultry and eggs, from every section of the country and Canada will attend this 20th annual conference to get the facts about new operating methods, supplies and equipment."

New York State Association of Refrigerated Warehouses

THE annual meeting of the New York State Association of Refrigerated Warehouses was held Thursday, August 18, at The Belhurst, beautifully situated on Seneca Lake, Geneva, N. Y. A program of interest to all members was presented in cooperation with the New York State Experiment Station at Geneva.

The meeting opened with a morning session for association business and reports, followed at noon by a special roast beef dinner.

The afternoon session was devoted to three informative discussions by leaders of the Experiment Station. Frank E. Lee discussed "Relationship of Storage Temperatures to Rapid and Slow Freezing." Dr. Willard B. Robinson gave a talk on "Color and Flavor Changes in Stored Fruits and Vegetables." George Hucker, past president of the Institute of American Food Technologists discussed "Recent Developments in Food Processing."

Storage of Sweet Corn

CONDENSED information on the storage of sweet corn has been issued by the Refrigeration Research Foundation. Green corn, it states, is another crop rarely handled in cold storage but it can be held temporarily in case of excess supply. An important factor is that freshly harvested corn be cooled promptly because sugar content (very important in quality) rapidly decreases at ordinary temperatures. Corn has a marked tendency to heat and should be so handled as to permit circulation of cool air from the crates. It should not be handled in bulk.

In a report of recent research supported in part by the California Association of Ice Industries, L. L. Morris of California Agricultural Experiment Station at Davis has pointed out that ordinary temperatures in transit and marketing are too high for retention of desirable table quality for more than a few hours. He demonstrated, however, that icing the crates has value as a method of cooling and holding at lower transit temperatures, and it would be advantageous if lower temperatures could be obtained than are common now. He estimates that a 40-lb. crate of corn requires a minimum of about 13 lbs. of ice just to cool it to 40 F. and remove heat of respiration for a period of one week in transit. It is difficult to cool corn below 40 F. because the husks have effective insulating properties. More ice than 13 lbs. per crate would help.

In Georgia Agricultural Experiment Station studies by Speirs, Warren, and Wilson, supported in part by the Georgia Ice Manufacturer's Association, sweet corn stored with heavy icing remained good for four days and was fairly juicy and sweet, even after 12 days and also had retained 68 per cent of its vitamin C.

Fresh corn, like many other vegetables, could be held longer with high quality under a system of continuous refrigeration from field to consumer.

Summary of Storage Conditions

Temperature: 31 to 32 F.
Relative humidity: 85 to 90 per cent.
Storage Period: Not over 4 to 8 days, depending on continuity of refrigeration.

New Head Shipping and Storage Branch

THE appointment of Martin J. Hudtloff as Director of the Production and Marketing Administration's Shipping and Storage Branch, effective July 25, has been announced by Ralph S. Trigg, PMA Administrator.

Mr. Hudtloff first joined the staff of the Department of Agriculture in 1946, after many years in business and financial administrative positions. He served with the United States Army from 1942 to 1946, first in charge of the Regional Accounting Office at Chicago, and later as a Colonel with the Army occupation forces in Germany, where he was fiscal adviser to the Director for military government affairs. After coming to the Department, he was Deputy Assistant Administrator for Fiscal and Inventory Control, Production and Marketing Administration, for a year. He has been Controller of the Commodity Credit Corporation since that office was established in April, 1947.

H. F. Shambarger, CCC Assistant Controller, will be in charge of the work of the Controller's office when Mr. Hudtloff takes over his new assignment as Shipping and Storage Branch Director. H. O. Warlick, who has been serving as Director of the Shipping and Storage Branch, will continue with the Branch.

Government Egg Program Shows Bad Effect on Quality and Market

EIGHTY percent of the firms surveyed recently by the Institute of American Poultry Industries reported that the government's 1948-49 egg support program, at 90 percent of parity, had an unfavorable effect on their quality egg marketing programs. These firms, located in the support buying areas, buy eggs directly from 118,723 producers.

According to this survey, the 90 percent support price has reduced premiums for top quality and decreased the number of producers willing to participate in quality programs offered by graded outlets.

Results of the survey, detailed later, have been forwarded to the Senate and House Agriculture Committees, in support of the stand taken by producer groups in favor of lower, flexible support levels for poultry and eggs.

"We hope the information obtained from this survey will help Congress steer clear of unsound price support legislation for poultry and eggs," commented Cliff D. Carpenter, president of the Institute, "for as long as high, rigid supports are continued, the hundreds of thousands of dollars industry and government have spent on quality improvement might as well be thrown away. It's high time this situation was corrected."

If the current practices were discontinued, Mr. Carpenter added, the industry itself would bring the egg market into balance and stabilize it within a six month period.

Large Government Purchases

Last year the government bought more than 85 million dozen eggs in dried form, to support farm egg prices at 90 percent of parity. More than 48 million dozen of these, in dried form, are still undisposed of.

So far this year, government purchases under the 1949 90 percent support program have taken 162 million dozen eggs off the market. More than 143 million dozen of these, in dried form, remain to be disposed of, with no outlet in sight.

These figures alone are enough to explain why the 3 billion dollar poultry and egg industry is so vitally interested in farm support legislation—and why the major poultry and egg producer groups have told Congress they oppose high, rigid supports. Not only have these high supports encouraged overproduction and wasted taxpayers' monies. They have also discouraged the marketing of fine quality eggs, by reducing the premiums for top quality, which serve as incentives to producers to take the extra care required for quality maintenance.

Survey Shows Results

Proof of this damaging effect on quality egg production and marketing is provided by a survey made in July, 1949 by the Institute of American Poultry Industries. In this survey, the Institute sent out questionnaires to firms who buy shell eggs directly from producers in 14 states located in the support buying area.

Sixty firms, buying directly from 139,759 producers, replied. Of these sixty:

- 8 per cent reported that the government's 1948-49 egg support program had *no effect* on their quality egg programs.
- 6.7 per cent reported a *favorable* effect.
- 80 per cent reported an *unfavorable* effect.

Of the 48 (buying directly from 118,723 producers) reporting an *unfavorable* effect.

- 89.5 per cent reported that the government's 1948-49 support program at 90 per cent of parity had raised the value of undergrade eggs in relation to the value of top grade eggs.
- 81 per cent reported that the government support program had decreased their volume of eggs bought on grade.
- 87.5 per cent reported that the government support program had decreased the number of producers participating in their grading programs.
- 95.8 per cent reported that the government support program had decreased interest by producers in the production of quality eggs.
- 91.6 per cent reported that the government support program had narrowed margins between low quality and high quality eggs to the extent the efficient producer was discouraged.
- 27 per cent reported that the government support program had forced them to discontinue their quality programs partially or temporarily.
- 23 per cent reported that the government support program had forced them to discontinue their quality programs altogether.
- 41.6 per cent reported that the government support program had made their quality programs unprofitable, but they had continued them at a loss.

The Institute pointed out that this survey was made for the purpose of providing Congress with factual proof that 90 per cent supports for eggs are so out of line with the general economy today that they are wrecking quality egg marketing programs. It did not imply any opposition to lower government supports for eggs which will not encourage overproduction, waste taxpayers' monies, or disrupt quality egg marketing programs.

Shell Eggs in Storage

Before the present government inflation program on eggs, large quantities of shell eggs were placed in storage during the peak production period in the first half of the year. These eggs were available for consumers use when production dropped later in the year. Now the situation is greatly altered as the following data on shell eggs in storage on July 1 shows:

5 year average 1937-41	7,440,000 cases
1947	4,178,000 cases
1949	2,316,000 cases

It will be noted that storage stocks of shell eggs on July 1 this year were 31 per cent of the prewar average and 55 per cent of the quantity in storage in 1947. The latter comparison is made because in the fall and winter of 1947 the government inflation program really worked. The price of eggs rose to a high level which brought anguished cries from the consumers.

This year much more of the egg storage space in refrigerated warehouses is empty. The result could be a more serious hold-up of the consumers. An added factor is that frozen egg stocks are 100 million pounds short of what they were of July 1, 1948. Thus an additional squeeze looms for egg users.

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Activated Carbon for Fruit Storage

To the Editor:

As a reader of ICE AND REFRIGERATION since 1913, my attention has been drawn to the note on activated carbon for pear storage in the April 1949 issue of ICE AND REFRIGERATION. The writer presented at the VII International Congress of Refrigeration at The Hague, Holland, in 1936, a paper on the activating effect of ripened fruit on neighboring fruit and in this paper, described investigation of the use of activated charcoal for the removal of gases emitted from William pears in storage. I think it would be fair for the American scientists who have rediscovered my process to mention my first studies on that subject.

L. FONTANEL, General Manager
Entrepôts Frigorifiques Lyonnais, Lyon, France

An abstract of the paper presented at the VII International Congress of Refrigeration in 1936 by Mr. Fontanel follows:

Activating Effect of Ripened Fruit On Neighboring Fruit

It has been observed that fruits placed in the proximity of very ripe specimens ripen much more rapidly than fruits stored in the same cold room but at greater distance. This is not a suffocation effect, since the CO_2 given off has a maturation retarding action. The activation effect appears rather due to volatiles, the phenomenon being particularly apparent when the ripe fruits emit their characteristic smell. The means for counteracting this effect have been investigated.

Strong ventilation is ineffective and rather prejudicial. Constant air renewal implies an increased refrigeration load and it hastens the maturation of the fruit and promotes desiccation.

Ozonization has not appeared desirable; ozone can but accelerate the basal metabolism and, consequently, shorten the life of the fruit.

Removal of the volatiles given off by absorption on active charcoal was investigated. In a room of 300 cu. m. capacity, it was found possible to eliminate the undesirable gases and smells and an apparatus containing 70 Kg of active charcoal, without accelerating the air renewal nor modifying the CO_2 content of the air in the room.

The author intends to continue these investigations and hopes for the collaboration of French and other laboratories in the study of the causes and effects of the activation phenomena in question and the remedies for counteracting them.

Frank Pilley & Sons Acquired by City Products Corporation

THE capital stock of Frank Pilley & Sons, Inc., of Sioux City, Iowa, one of the large manufacturers and processors of dairy and poultry products has been acquired by City Products Corp. of Chicago, Ill., according to an announcement by William J. Sinek, president of City Products Corp.

The Pilley Company's headquarters are at Sioux City, Iowa, where it operates one of the largest creameries in the country, the Hanford Creamery, which was established in 1888. Dairy and processing plants are located at Springfield, Norfolk and Wakefield, Nebr., and Hospers, Merrill, Cherokee and Ida Grove, Iowa.

The company's products have been and, according to Mr. Sinek, will continue to be marketed under its nationally known brands — Hanford's finest sweet butter, Pilley's butter, cheese, ice cream and milk, and Poultryland egg and poultry products. Frank E. Pilley, president of the company will continue in that capacity, and will have general charge and supervision of operations under the new ownership, according to Mr. Sinek.

Inflation and Deflation

PERIODS of inflation and deflation have followed every major war in a monotonous pattern. A quick look at their history might throw some light on what we can expect from the present decline. According to the BLS price index (1926 equals 100), prices during the World War I period rose from 67.3 in July 1914, to 167.2 in May 1920, then declined over a 15 months period to 91.4 in January 1922 where they leveled off. This wiped out 75.9 per cent of the previous inflation. The World War II inflation began at 75.0 in August 1939 and reached its peak of 169.5 in August 1948. If the pattern of World War I and previous inflation-deflation periods repeats itself, we can expect the price index to decline to about 97.8. Only about one-fifth of this decline has occurred to date, and at this rate the decline probably won't reach bottom for another three years. Of course, this decline may be speeded up or retarded depending on lots of factors, not the least of which is what the government does. We don't claim to have a crystal ball, but we think the comparison is interesting— NARW Bulletin.

New Co-operative Cold Storage Plant

THE new Vineland Growers' Co-operative cold storage plant, recently put into operation at Hamilton, Ont., Canada, will provide a needed facility to the growers of the district as well as to the fresh fruit markets throughout the province. With a capacity of 30 car loads or 50,000 bushels, and including facilities for rapid cooling of 15 carloads, the new plant already has proved effective in preventing a glut on the market of fresh fruits.

P. H. Schweyer, manager of the Vineland Growers Co-operative, said the new plant will cost about $160,000 when completed. The second floor of the structure is used for holding fruit and the first floor is equipped for rapid pre-cooling of fruits during the summer season.

Present facilities of the plant allow for the pre-cooling of eight car loads at one time. The growers have built their own railway siding to the plant.

Canadian Cold Storage Holdings

THE Dominion Bureau of Statistics of Canada, Agricultural Branch, reports the following commodities held in cold storage on July 1, 1949 as compared with July 1, 1948 and June 1, 1949.

Apples in cold storage on July 1, 1949 amounted to 43,491 bu. as compared with 93,593 bu. July 1, 1948 and 143,923 bu. June 1, 1949.

Frozen fruit holdings in storages and factories July 1, 1949 amounted to 13,983,000 lbs. as compared with 12,769,000 lbs. July 1, 1948 and 11,262,000 lbs. June 1, 1949.

Stocks of frozen vegetables in storages and factories on July 1, 1949 amounted to 2,984,000 lbs. as compared with 3,192,000 lbs. July 1, 1948 and 3,592,000 June 1, 1949.

Missouri Valley Chapter

AT the quarterly meeting of the Missouri Valley Chapter of the National Association of Refrigerated Warehouses held in June, the following new officers were elected: Chairman, E. M. Neylon, St. Louis; Vice Chairman, J. W. Wilkerson, Kansas City; Treasurer, George M. Brown, Wichita, Kans.; Executive Committee: H. A. Gross, St. Louis; F. D. Newell, Jr., Minneapolis; N. E. Van Dyne, Parsons, Kans.; J. W. Waller, York, Nebr.

Turkey Price Support Program Is Announced by USDA

THE U. S. Department of Agriculture has announced a program for support of producer prices of live turkeys at a national average price of about 31 cents a pound. The support price is expected to approximate 90 per cent of parity for the marketing season.

The program will operate for the period August 1 through December 31, 1949, in support of producer prices through purchases of frozen dressed turkeys. In addition, the program provides for the purchase from vendors, during the month of July 1950, of frozen dressed turkeys in storage which were purchased from producers in 1949. The program is being announced to encourage orderly marketing of the increased production expected this year as compared with output in 1948.

The purchase of dressed turkeys will be made on an offer-and-acceptance basis at announced prices intended to reflect a national average live weight price to producers of about 31 cents a pound. The announced support prices will provide a floor below which average farm prices should not fall. Last year, producers received a U. S. average live weight price of 47.4 cents per pound for turkeys sold from August through December—establishing an all-time record level.

Purchases of turkeys during the month of July 1950 have been arranged under the program to encourage the trade to store turkeys during the normal marketing season. Purchases for that month will be confined to these turkeys in storage which were bought from producers during the period August 1 through December 31, 1949.

Under the price support program the U. S. Department of Agriculture will purchase box-packed frozen dressed young turkeys in carlot quantities of Grade A and B only from producers, producers' agents, cooperative organizations, or processing firms. Purchases will be made only at public or private warehouses approved by the Production and Marketing Administration of USDA. The Department will purchase turkeys only from those vendors who certify they have paid producers the announced support prices for each month for all live turkeys purchased from August 1 through their contract delivery date. Vendors offering turkeys during July 1950 must certify that they have paid producers not less than support prices for each applicable month on all turkeys they purchased from August 1 through December 31, 1949. The program requires that all dressed turkeys bought by the Department meet Federal grade specifications.

Four Zones Established

Four zones have been established in which producer support prices for live turkeys and prices for dressed turkeys have been designated for each month of the 1949 marketing season—August 1 through December 31. These zones are:

Zone I. Washington, Oregon, California, Idaho, Montana, Nevada, Utah, Wyoming, Colorado, Arizona, New Mexico, Oklahoma, Texas, Arkansas, and Louisiana.

Zone II. North Daokta, South Dakota, Nebraska, Kansas, Minnesota, Iowa, Missouri, Mississippi, Alabama, Georgia, South Carolina, and Florida.

Zone III. Wisconsin, Michigan, Illinois, Indiana, Ohio, Kentucky, Tennessee, West Virginia, Virginia, Maryland, Delaware, District of Columbia, and North Carolina.

Zone IV. Maine, New Hampshire, Vermont, New York, Massachusetts, Connecticut, Rhode Island, Pennsylvania, and New Jersey.

Live Weight Prices

In Zone I the live weight prices that vendors must certify that they have paid for all Grade A live young turkeys obtained from producers in each of the months indicated are as follows:

Weight Class	Aug. 1949	Sept. 1949	Oct. 1949	Nov. 1949	Dec. 1949
Under 18 lbs.	34.50	34.75	35.00	35.25	35.25
Up to 22 lbs.	31.25	31.50	31.75	32.00	32.00
22 up to 24 lbs.	27.75	28.00	28.25	28.50	28.50
24 lbs. and over	25.00	25.25	25.50	25.75	25.75

Producer prices for live turkeys in Zone II will be 0.75 cents higher than in Zone I, in Zone III, 1.5 cents higher, and in Zone IV, 2.25 cents per pound higher. Producer prices for Grade B turkeys, live weight, will be 3 cents per pound lower than the Grade A prices designated for each zone.

The prices at which the Department of Agriculture will buy Grade A, box-packed frozen dressed young turkeys, f.o.b. any approved warehouse from vendors in Zone I during each of the designated months and for July 1950 are as follows:

Weight Class	Aug. 1949	Sept. 1949	Oct. 1949	Nov. 1949	Dec. 1949	July 1950
Under 16 lbs.	45.75	46.00	46.25	46.50	46.50	48.00
16 up to 20 lbs.	41.75	42.00	42.25	42.50	42.50	44.00
20 up to 22 lbs.	37.75	38.00	38.25	38.50	38.50	40.00
22 lbs. and over	34.25	34.50	34.75	35.00	35.00	36.50

USDA purchase prices in Zone II will be 0.75 cents higher than in Zone I, in Zone III, 1.5 cents higher and in Zone IV, 2.25 cents higher. Grade B price for dressed turkeys will be 3 cents below the prices for Grade A dressed turkey in each of the Zones.

Purchase regulations provide that more than one grade and class of turkeys may be delivered in each carlot, but that each car may not contain more than 30 percent of Grade B birds. Deliveries must be made within 30 days of the date that turkeys are dressed, except for purchases during July 1950, and offers are subject to cancellation by the vendor 10 days before date of delivery.

Turkey Support Program Modified

THE U. S. Department of Agriculture has modified the 1949 turkey price support program to make it possible for vendors to offer turkeys to the Government any time between August 1 and December 28, 1949. Any turkeys offered during this period must be delivered within 30 days of the date offered. Originally, the program required that frozen, dressed turkeys be offered to the Commodity Credit Corporation during the period August through December within 30 days after date of slaughter.

As a result of this modification, producers and vendors will have a greater opportunity to market their turkeys in regular trade channels throughout the marketing season and including the holiday season. The modified ruling is expected to make greater quantities of turkeys available in regular market channels and to reduce the numbers which may be bought for price support purposes.

No change has been made in the provision whereby offerings will be accepted from vendors during the month of July 1950 for turkeys in storage.

Storage of Green Peas

GREEN peas are benefited by icing according to a fact file sheet on their storage issued by The Refrigeration Research Foundation.

Unlike green or wax beans, which should not be contacticed except at retail, and not to exceed one-day (TRRF Fact File Sheet, Nov. 1948) peas are benefited by icing. Green peas lose sugar content, on which flavor depends, unless they are cooled promptly to near 32 F. shortly after they are picked. They keep better unshelled than when shelled.

For these reasons rapid methods of cooling, as in an air blast or in ice water, are an advantage, prior to shipment and storage. Such cooling removes field heat and continued cooling removes heat of respiration. Icing in transit is highly beneficial.

Market Diseases (Most Serious)

Bacterial soft rot: Watersoaked appearance, softening of tissue. Areas turn brown and mushy. *Control:* Sanitation and control of temperature.

Gray mold rot: Watersoaked grayish-green spots ¼ to ½ in. in diameter. On larger areas a moderately fine white mold. At 32 F. about two weeks are required for lesions to become visible; at 50 to 72 F. they may become apparent in two to four days. *Control:* Pods that show small spots should not be packed for long-distance shipment.

Watery soft rot: "Nests" of decay in hampers or other containers. Decayed pods hold together by mold. *Control:* There is no way of completely controlling this disease. Holding temperatures as low as possible helps, but infection may spread at temperatures as low as 32 F.

Summary of Storage Conditions

Temperature, 32 F.
Relative humidity, 85 to 90 per cent.
Storage period: One to two weeks, perhaps a week longer if packed in crushed ice.

Peanut and Pecan Storage

A PROGRESS report has been issued by the Refrigeration Research Foundation on Project 27 covering peanut and pecan storage, being conducted by J. G. Woodroof of the Georgia Experiment Station.

Dr. Woodroof has found that rate of respiration of shelled peanuts is so low that it is not important as a factor in storage. At summer temperature, a ton of peanuts containing 10 per cent moisture will produce only 200 to 300 Btu. per 24 hours, and at 35 F. only about 10 per cent of that amount. At 10 per cent moisture, heat is evolved by molds, which account for a large part of this heat. Under refrigeration, molds do not develop at this moisture content. At 8 per cent moisture, a commonly recommended lower limit for stripping, there is danger of mold. Seed peanuts under these conditions have low germination rates. Mold growth has been observed in peanuts in closed containers, at room temperature, with moisture content as low as 7.7 per cent. Further studies are under way.

Rate of cooling of shelled peanuts in piled 120 lb. bags at 34-36 F., was 7 to 8 days to reach 34 degrees from 74 degrees in the center. With air draft at 950 fpm along sides of the pile, this time was reduced to two days. Burlap bags lined with asphalt adhesive have been superior for storing shelled or unshelled peanuts under any conditions tested.

Pecans are being studied similarly to peanuts. The rates of darkening of various nuts as well as effects of packaging materials on browning of pecans due to escaping ammonia from the refrigeration system was studied while there was an ammonia leak in the refrigeration system. Virginia and Spanish peanuts, filberts and pecans were exposed to ammonia fumes in the engine room at 60 F. Packaging shelled pecans in cellophane, pliofilm and aluminum foil prevented blackening when packages were exposed to ammonia fumes. Pecans left open and those packed in cardboard blackened. Pecans and filberts were more susceptible to browning than were peanuts. Spanish peanuts were browner than Virginia.

To study the effect of temperature on the development of rancidity in pecans during storage, shelled and unshelled Stuart pecans have been stored at four temperatures (0, 33, 50 and 75 F.). They are being examined at regular intervals organoleptically for changes in eating qualities, and chemically for changes in peroxide numbers, free fatty acid, and moisture content. After 121 days pecans stored at 75 F., room temperature, have been the only ones to develop any rancid flavor.

Shelled and unshelled pecans were stored in closed chambers with apples at room temperature and at 34 F. They were tested at regular intervals by a panel of judges for a comparison of the rate of absorption of the odorous volatiles from the apples. Shelled pecans at 34 F. required four times as long to acquire a strong foreign flavor as those at room temperatures. Those at room temperature molded after 15 days while those at 34 F. had a strong flavor after 27 days and were removed to the open air at room temperature. After five days, they still had a strong apple flavor which made them taste like black walnuts. Unshelled pecans have not yet obtained a strong foreign flavor at either temperatures.

Cranberries Can be Packed in Field

CRANBERRY merchandisers have found the handy red-revealing cellophane package, which can be filled at point of production, pleases the consumer and builds up sales. Now U. S. Department of Agriculture research men announce this finding from a project under the Research and Marketing Act that indicates the feasibility of putting up the berries in the retail bag at the bog or the storage plant.

"This is a safe and economical procedure," says D. F. Fisher, in charge of research in refrigerated storage and transportation of fruits and vegetables, at the Plant Industry Station, Beltsville, Md. "The results proved it is practical to store the prepackaged berries for four to eight weeks without risking excessive spoilage, if the temperature is kept down to 33 or even at 38 F. Berries stored four weeks at the lower temperature could be kept at 70 for a week following the cold storage and lose very little from decay, an indication they would stand up well for that length of time while being held in a retail store or in the home of a consumer. There was somewhat more decay when they were stored at 38 F., and at 50 F. it was heavy during storage and during the week of holding at 70 F."

The specialists recommend the use of perforated cellophane bags, but say they found no evidence of "smothering" effect when non-perforated bags were used except when they were heat-sealed by hand to insure tight closure. They see in their results the possibility that most of the cranberry crop can be marketed in the convenient small bags filled before storage and opened by the housewife as long as 2 months later, plus a few days of grace at room temperature.

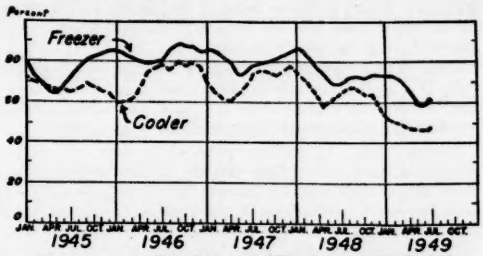
Cold Storage Holdings — Both Freezer and Cooler Space Show Increase over June

APPROXIMATELY 76 million pounds more foodstuffs were in storage July 1 than on June 1. Most of the increased poundage was stored in freezers. All freezer items except meat items and poultry showed net increases in their storage stocks during June. Frozen fruits, vegetables, butter, and eggs accounted for the greatest quantities of frozen products moving into storage. The outmovement of apples, pears, meats, and lard from cooler storage was a little more than balanced by the in-movement of other cooler commodities, among which the greatest net increase occurred in holdings of cheese and shell eggs.

TABLE I—COLD STORAGE HOLDINGS IN PUBLIC, PRIVATE AND SEMI-PRIVATE WAREHOUSES, APPLE HOUSES AND MEAT PACKING PLANTS (000 LBS.)

	July 1, 1949	June 1, 1949	July 1, 1948	Five-year Average
Meat and meat products, lbs.	607,292	672,798	778,747	741,317
Lard and rendered pork fat, lbs.	106,614	125,823	181,327	175,541
Frozen poultry, lbs.	74,253	77,823	99,507	134,541
Creamery butter, lbs.	101,191	51,056	53,073	77,836
American cheese, lbs.	140,270	117,021	140,038	142,952
Other cheese, lbs.	18,538	15,858	23,016	25,787
Shell eggs, cases	2,316	1,943	5,669	7,440
Frozen eggs, lbs.	166,026	141,361	266,748	275,853
Apples, bu.	338	1,294	392	.....
Frozen fruits, lbs.	256,264	237,856	280,744	241,944
Frozen vegetables, lbs.	220,194	186,821	181,526	162,880
Frozen fish	112,381	91,453	100,537	87,156

But in spite of this increase, occupancy was the lowest it has ever been for this season of the year since records have been compiled. Warehouses reported occupancies of 52 per cent in cooler and 62 per cent in freezers. Cooler occupancy was down 22 points from the July (1944-48) average while freezer occupancy was down 16 points. The low occupancy prevailed throughout the country, no geographic region having a cooler occupancy above 65 per cent, or a freezer occupancy above 84 per cent. Minneapolis is the only city with an occupancy of above 90 per cent on July 1, 1949. Occupancy in private warehouses, 46 per cent for coolers and 56 per cent for freezers, corresponded closely to public occupancy. The storage space utilization in meat-packing plants, however, was considerably above that of other types of refrigerated warehouses. Here more than four-fifths of the space was reported in use on July 1.



Occupancy in Refrigerated Warehouses, 1945-1949

Some 256 million pounds of frozen fruits and 220 million pounds of frozen vegetables were in storage July 1. The net into-storage movement of frozen fruits and vegetables was the same as in June 1948, but 15 million pounds above the average June movement. Raspberries, strawberries, Young and Loganberries, and blackberries were the fruit items moving into store during the month. Stocks of strawberries, 80 million pounds, were off a fifth from last July's holdings. Asparagus, green peas, and spinach were vegetable items moving into storage. Holdings of peas, 86 million pounds, were 36 million pounds above average July 1 stocks and 8 million pounds above stocks of a year ago. Stocks of spinach, 25 million pounds, were nearly twice those of July 1, 1948. Dried fruits, 47 mil-

TABLE II—PERCENTAGE OF SPACE OCCUPIED IN PUBLIC COLD STORAGE WAREHOUSES (APPLE HOUSES EXCLUDED)

	Net Piling Space (000 cu. ft.)		July 1, 1949 (%)		June 1, 1949 (%)		July 1, 1948 (%)		5-Year Average (%)	
	Cooler	Freezer	Cooler	Freezer	Cooler	Freezer	Cooler	Freezer	Cooler	Freezer
New England	3,561	6,327	45	74	34	69	53	48	76	68
Middle Atlantic	42,086	33,798	43	57	42	52	57	66	69	80
East North Central	36,000	26,304	63	60	56	59	77	76	80	76
West North Central	11,006	16,733	59	65	56	69	81	83	83	81
South Atlantic	11,634	6,368	53	73	58	75	75	73	77	82
East South Central	4,199	3,647	65	84	71	87	87	85	87	82
West South Central	7,041	5,195	65	53	67	55	75	74	81	83
Mountain	2,150	2,707	62	66	61	62	75	77	82	82
Pacific	18,936	21,462	39	59	35	50	53	64	58	74
United States	136,852	124,741	52	62	50	59	67	71	74	79

TABLE III—PERCENTAGE OF SPACE OCCUPIED IN PRIVATE AND SEMI-PRIVATE REFRIGERATED WAREHOUSES AND MEAT PACKING PLANTS

	Private and Semi-Private Warehouses						Meat Packing Establishments					
	Net Piling Space (000 Cu. Ft.)		Space Occupied—Per Cent July 1, 1949		Space Occupied—Per Cent June 1, 1949		Net Piling Space (000 Cu. Ft.)		Space Occupied July 1, 1949		Space Occupied June 1, 1949	
	Cooler	Freezer	Cooler	Freezer	Cooler	Freezer	Cooler	Freezer	Cooler	Freezer	Cooler	Freezer
New England	554	1,113	30	51	39	63	1,968	725	81	.....	85	.....
Middle Atlantic	3,293	4,430	42	40	40	41	6,731	740	72	55	89	69
East North Central	5,779	2,576	66	39	64	41	15,885	6,891	88	86	88	64
West North Central	2,123	3,929	76	80	75	63	25,718	10,549	86	81	88	89
South Atlantic	647	1,377	19	71	10	73	2,377	609	90	99	95	100
East South Central	190	101	.....	.....	100	.....	2,014	403	58	83	84	90
West South Central	700	764	30	46	30	36	3,670	1,452	100	100	100	100
Mountain	182	654	85	24	90	99	2,028	666	96	98	97	98
Pacific	5,383	6,554	23	62	14	40	4,056	1,152	92	86	91	96
United States	18,851	21,498	46	56	49	47	64,347	22,887	86	82	89	79

lion pounds, were less than half average stocks. About 28 million pounds more tree nuts were reported in storage than in 1948. Stocks of potatoes were less than a year ago. Stocks of onions were more than twice as great as stocks of a year ago.

July 1 stocks of butter totaled 101 million pounds, the largest storage stocks since the war years. Cheese stocks on July 1 totaled 161 million pounds which was slightly below levels of a year ago and average. The 26-million-pounds increase in holdings was a third below average.

Poultry products on July 1 were generally well below average stocks. Shell egg holdings were 5 million cases less than average; frozen eggs 114 million pounds less than average; frozen poultry 62 million pounds less than average. A net increase in shell egg stocks of .4 million cases during June was less than half the quantity normally stored during the month and left July 1 stocks at only 2.3 million cases. Frozen eggs reached 162 million pounds on July 1. The June in-movement was off a third from average. Poultry in storage July 1 totaled 72 million pounds. Stocks were off a fourth from those of July 1, 1948.

During June, 15 million pounds of beef, 73 million pounds of pork, 25 million pounds of lard and rendered pork fat, and 5 million pounds of miscellaneous meat products were withdrawn from storage. Beef on hand July 1 totaled 72 million pounds, which compares with 83 million pounds this time last year, and 106 million pounds on July 1, 1947. Of the 393 million pounds of pork in storage on the first of this month, almost half, 192 million pounds were frozen. This time last year frozen pork totaled 323 million pounds. Stocks of sausage, lamb and mutton were below the average July 1 holdings but veal, canned meats, and edible offal in storage were greater than average. Lard and rendered pork fat, stocks at 100 million pounds on July 1 were 75 million pounds below average and 81 million pounds below stocks on hand a year ago this date.

Seasonal increases in stocks of miscellaneous fillets, halibut, and whiting, during June raised the total of frozen fishery products in storage to 112 million pounds. The net increase in stocks of 21 million exceeded last year's increase and the average into storage movement by 6 million pounds. On July 1, frozen salt water species totaled 88 million pounds, fresh water species 8 million pounds, and shell-fish 16 million pounds.

Storage Outlook

Storage occupancy on the first of this month in public coolers equalled the record July 1 low reached in 1940. This month, only 52 per cent of the cooler space in public refrigerated warehouses was used for the storage of foodstuffs. Unlike 1940 however, when the June to July increase was 7 points, this year's increase was only 2 points. This increase nevertheless was about average for this time of year when compared with the last five years. Such items as cheese and shell eggs moved into storage in less than average amounts during June, while stocks of apples and pears moved out of storage in greater than average quantities. On the basis of the light supplies of shell eggs and the historical pattern of cooler occupancy, August 1 cooler occupancy may well be unchanged from this month, but at the most 1 point greater than July 1.

Freezer space utilization on July 1 was at a record low. Public warehousemen reported that 62 per cent of the freezer space was filled. The previous July 1 low was 65 per cent rcorded in 1940. Although the seasonal increase in occupancy was greater than average, the movement of some commodities into storage was below average, while other important food items moved out of storage in greater than average quantities. To the former class belongs cream and frozen eggs, while in the latter classification are such freezer items as beef and pork. Whether freezer occupancy is to increase or not during the month will depend much on the in-movement of frozen fruits and vegetables during July, which have already shown signs of increasing in greater than average amounts. Normally, there is an increase of three points, which would place freezer occupancy at 65 per cent—but which would still be below the 1940 level.

Cold Storage Stocks of Frozen Fruits and Vegetables

OF the 103 million pounds of frozen peaches, raspberries and strawberries in storage July 1, seventy per cent, or 72 million pounds were classified as to container size. Of the stocks classified, 31 per cent were reported to be in consumer-sized packages. Thirty-four per cent of the strawberries were in one-pound packages compared to 20 per cent at this time last year and 24 per cent last month. The percentage of consumer-sized containers of peaches also increased from 33 per cent June 1 to 36 per cent July 1.

COLD STORAGE STOCKS OF FROZEN FRUITS AND VEGETABLES IN STORAGE JULY 1 AND JUNE 1, 1939 IN PACKAGES OF ONE POUND OR LESS (000 OMITTED)

	July 1, 1949		June 1, 1949	
	lbs.	pct.	lbs.	pct.
Peaches	2,128	36	2,542	33
Raspberries	990	10	1,148	12
Strawberries	18,978	34	7,427	24
Asparagus	4,203	70	3,127	66
Beans, lima	8,678	62	10,107	62
Beans, snap	3,283	67	3,711	65
Corn, sweet	1,690	59	2,318	62
Peas, green	31,857	59	15,914	67
Spinach	10,403	79	9,382	78

Total holdings of the six frozen vegetable items surveyed amounted to 167 million pounds. Fifty-seven per cent of this total were classified as to container size which compares with a coverage of 52 per cent last month. Green peas showed the greatest change in the ratio of retail packages to larger containers. On July 1, 59 per cent of the peas were in one-pound containers, a decrease of 8 points from the June figure. A decrease in the percentage of one-pound packages from last month was also shown for corn. Lima beans remained the same at 62 per cent while asparagus increased from 66 per cent on June 1 to 70 per cent on July 1 and snap beans increased 2 points to 67 per cent. There was a marked increase over last year this time in the percentage of one-pound containers of all vegetables, the greatest increase being in snap beans which rose from 40 per cent July 1948 to 67 per cent this month.

Omaha Cold Storage Wins Protest

THE Omaha Cold Storage Co. of Omaha, Neb., which owns the Phelps County Produce Co. at Holdrege, Neb., was successful in its protest to the Nebraska State Railway Commission to keep the Burlington Railroad from dropping two trains on the Holdrege branch line. The railroad contended the line was losing money, but the state commission held that evidence presented by the railroad was not sufficient to warrant a discontinuance order.

The Ice Industry

National Association of Ice Industries

Executive Offices
1706 L St. N. W., Washington 6, D. C.

PRESIDENT
M. J. Garvey, St. Joseph, Mo.

EXECUTIVE SECRETARY
Mount Taylor, Washington, D. C.

Ice Industry Establishes Budget of $500,000 for 1950 Public Relations Campaign

AT A recent meeting of the top executives of the National Association of Ice Industries, held at the Hotel Sherman in Chicago, plans were made to raise $500,000 for the 1950 Public Relations Campaign budget. A minimum goal of $450,000 was set. A concentrated drive will begin on September 1, 1949, to encourage more ice companies to invest a sum based on 1948 ice tonnage. No change was made in the basic amount—three cents per ton—which subscriber companies will pay.

Committees Meet

Five committees met on successive days to formulate plans for the coming year. The week-long session of conferences was opened with a discussion by representatives of the "Group of Nine" companies which have been very active in past years in supporting the Public Relations program. Seven of the companies were represented by personal representatives. Circumstances prevented the other two from attending. During the past two years it had been the policy of these companies to match every other ice company's subscription dollar for dollar. Henceforth, as a result of this meeting, all ice companies will invest proportionate shares of their annual tonnage, on a basis of three cents per ton on all ice sold, regardless of the size of the company.

Steers New Treasurer

At a meeting of the Executive Committee, President M. J. Garvey announced the appointment of George E. Steers as the new Association Treasurer. Mr. Steers, who is Chairman of the Public Relations Department and a member of the Board of Directors, assumes the position left vacant by the untimely death of William K. Martin. The naming of Mr. Steers as Treasurer received unanimous approval by the Executive Committee.

President Garvey, likewise with the unanimous approval of the Executive Committee, appointed J. C. Thompson, President of The Southland Corporation, Dallas, Texas, to serve as a member of the Board of Directors and the Executive Committee. This appointment was also necessitated because of Mr. Martin's passing.

The mechanics of how all ice companies would be approached during the next Public Relations Campaign fund-raising drive were thoroughly discussed and outlined during the meeting of the Department Committee.

Plans for the 1949 Convention to be held at the Hotel Commodore in New York indicate that Icemen who attend will be in for a lot of surprises. Preliminary details of arrangements for this convention are announced at this time in the following article.

Research and Engineering Committee

The Research and Engineering Committee met on the final two days of the week. Ways and means of better disseminating new ideas were talked over. The Committee devoted considerable discussion to various projects such as icing of vegetables; hydrocooling of peaches and corn; sanitation of beverage coolers; refrigeration of meats; icing of shrimp; standardization of paper bags; ice refrigerated bottle beverage vending machines; vending of ice; various surveys; iced poultry; and numerous cooperative efforts of outside industries, who rely on ice in preserving their products.

Personnel Training and Marketing

The Personnel Training and Marketing Committee was also in session for a two-day period. The National Ice Merchandising Forum received much of the Committee members' attention and it was decided that specific programs for local meetings could be prepared by this department and made available to Program Chairmen for meetings during next fall.

Research Department

A combined session was held with the Research Department Committee. During this joint meeting there was a complete discussion of the market survey of mechanical refrigerator owners now being conducted jointly by the two departments. The entire group also heard a very instructive talk by W. C. Glennon of the Poultry Division of Swift & Company. He gave them the inside story of the extensive poultry merchandising program his company is carrying out with ice. All agreed that Swift & Company should receive the full cooperation of the Association in continuing this campaign.

President Garvey expressed entire satisfaction with the amount of work covered during the conference week. He said that as long as icemen can get together and come to a meeting of minds, the ice industry will continue to prosper.

1949 Ice Convention Plans Surprises —Never a Dull Moment

ARRANGEMENTS are under way to present the most outstanding National Association of Ice Industries Convention in years when icemen get together at the Hotel Commodore, New York, this November 15-18.

At a recent conference of the Executive Committee, held in Chicago, preliminary steps for setting up the entire

convention program were outlined. Spokesman for the Committee, Mount Taylor, Executive Secretary of the Association, reported: "There is considerable thought being given to a complete about face in the pattern of the convention this year. It is high time the iceman, himself, had his say. We intend to shine the spotlight on the ice industry and see what makes it tick. Icemen, if present plans jell, will have an opportunity to learn what problems exist in various parts of the country. The solution of these industry problems will assist all ice companies in better serving their own areas. Icemen will be able to determine exactly what benefits they derive from Association membership.

"In addition, there will be some prominent, high calibre, outside speakers. Present plans call for a rousing, enthusiasm-producing platform which will keep the convention room filled to capacity at every session."

From Mr. Taylor's remarks, all indications point to a Convention where there will be no room for a dull moment.

The time of sessions will be kept brief to give visitors ample time to enjoy the sights and entertainment available in New York City.

So many icemen, who are coming to New York, are looking forward to seeing some of the better shows and hitting a few hot spots of entertainment, that there will be just one night of Association sponsored entertainment. This night, probably Thursday, will feature a banquet, a show consisting of the finest New York talent available, and a Ball.

The following Association members will make up the Program Committee: P. A. Buehrman, Chairman; John C. DePrez; H. Stewart Dunn; Ralph G. Hadley; William J. Lewis; Lewis H. Powell; O. A. Reardon. This Committee will meet on August 19, to make final plans for the complete Convention Program. Subsequent releases from National Association of Ice Industries Headquarters will carry this information.

New Wage and Hour Legislation

A REVISED Wage and Hour Bill sponsored by Senator Lucas has been introduced in the United States Senate. Among its provisions of chief interest to the ice industry is the fact that any ice plant will be completely exempted from the Wage-Hour Law if it meets the following tests:

1. More than 50 per cent of its sales are made within the state in which it is located, and

2. Seventy-five per cent or more of its sales is not for resale, and

3. Seventy-five per cent or more of its sales is recognized as retail sales in the particular industry, and

4. It is recognized as a "retail establishment" in the particular industry.

According to a bulletin issued by the National Association of Ice Industries many ice plants, including some of those of the largest companies, will qualify for this exemption. It marks the first time for 11 years that numerous ice plants can, if the present Lucas bill passes, be taken out from under the law.

Burlington Leases Refrigerator Cars

THE Burlington Railroad Co. has leased 300 new refrigerator cars from the Continental Illinois National Bank and Trust Co. of Chicago, according to papers filed with the secretary of state at Cheyenne, Wyo. The equipment is valued at $2,597,000 and includes 200 new standard 40-foot refrigerator cars with air-circulating fans, and 100 new 40-foot meat refrigerator cars without fans, the certificate stated.

National Ice Marketing Institute Announces Fall Opening

PLANS for fall opening of the National Ice Marketing Institute on October 3 have been completed. Comparatively speaking, enrollments are being received even better than last year. The first class is nearly filled to capacity. However, there are openings in all classes scheduled as follows:

October 3-14	January 2-13
October 24-November 4	January 23-February 3
November 28-December 9	February 13-24
	March 6-17

Unfortunately, it was necessary in some of the latter classes of the first series, which started last October, to turn down enrollments because classes were filled. However, the Institute management hopes to be able to take care of all applications for the present series, but members are urged to make their choice of dates known immediately. Considerable improvement and some changes have been made in the course and its method of conduct, based upon past experience.

The National Ice Marketing Institute Course is designed for company heads, sales managers, personnel directors, superintendents, office managers, supervisory executives, and all management personnel interested in expanding markets for ice. Following is outline of the course:

Unit I. Building the Sales Organization
- A. Job Descriptions (includes sample job descriptions of routemen, platform men, salesmen)
- B. Recruiting Sales and Service Personnel
- C. Selection of Personnel
- D. Interviewing Techniques
- E. Checking Applicants
- F. Breaking in New Employees

Unit II. Merchandising
- A. Selling Principles
- B. Surveys of Ice and Appliance Markets
- C. Methods of Increasing Sales
- D. Merchandising Commercial Products
- E. Merchandising Domestic Products
- F. Winter and Early Spring Business
- G. Sales Quotes
- H. Incentive Wage Plans
- I. Sales Contests
- J. Planning Merchandising Program

Unit III. Employee Training
- A. Organizing the Training Program
- B. Use of Lectures and Talks
- C. Conference Discussion Method
- D. Demonstration Method
- E. Use of Training Films

Unit IV. Employee Supervision
- A. Supervision and Leadership
- B. Duties and Qualities of a Supervisor
- C. Building Employee Morale
- D. Route Supervision and Records
- E. Handling Employee Problems
- F. Employee Ratings and Evaluation
- G. Safety Supervision

The course will be presented by the superintendent and a guest faculty of eight experienced conference leaders and instructors. Some of the faculty are ice people, some specialists in certain fields, and others are from industries whose interests coincide closely with the ice industry.

Ice Puller Killed by Hot Wire

AN ICE puller, Lester G. Tate, employed in the Williams Bros. ice plant, Oklahoma City, Okla., was electrocuted while working in the ice storage room. Apparently he had touched a live wire which supplies electricity to the mobile hoist, police officers reported. The ice plant engineer, Lester Albright, said he noticed no ice was being sent out from the storage room and upon investigation found Tate where he had fallen on the floor.

Newspaper Writers Learn About the Ice Business

IN two widely separated cities, Los Angeles on the Pacific Coast and Pittsburgh in the east, newspaper feature writers have learned that there are newsworthy stories in the ice business. James R. Hoyle of The Los Angeles Times discovered what he evidently thought was something new in the fact that the ice business is still a good business in spite of the competition of mechanical refrigerators. Kenneth Spear, feature writer for the Pittsburgh Sun-Telegraph, as a guest of H. Stewart Dunn, president of The Consolidated Ice Co. made a tour of Consolidated's ice plant. His story of the trip was described in the Sunday Sun-Telegraph of July 17.

Mechanical Refrigerators Haven't Licked the Iceman

By James R. Hoyle

I THOUGHT that icemen went out of style along with buggy whips and pump handles and minstrel shows.

But they didn't. They say we're still in the Ice Age and they resent being classified as Early American. "Business," they chorus, "is good. Very good. We're doing better than we did 10 years ago."

The war boomed the ice business in Southern California. The war-workers who swarmed in here with fat and loose purses soon learned that they could buy automobiles and tires and gasoline and potent potables, and that it was possible to finagle a red ration stamp once in a while—but mechanical refrigerators were as scarce as hen's teeth. They were black market items. But people could buy ice and iceboxes—and they did.

But while shortages contributed to the upswing in the ice industry, the improvement was by no means an unassisted double play. Before the war some folks just naturally preferred ice. They still do. And they aren't simply the low income group. Ice users include every class from the mink and sable circle down to the unemployed transient. The family bankroll may have some influence in the decision to use or not to use ice, but it is by no means the deciding factor.

And when a family decides to take the leap from the old-fashioned icebox to a mechanical unit, the old icebox isn't necessarily junked. The chances are it merely leaves one house, takes on a new coat of paint, and moves back into another kitchen.

I hated to break the news to our iceman when we bought our electric refrigerator, but he smiled gamely and offered to take the icebox off our hands. We paid him for hauling it away. He sold it and picked up a new customer at the same time.

Icemen aren't making a comeback—they never left—or so they say. Give them half a chance to talk about business and they'll bend your ears with statistics on the tonnage they deliver every week.

They do more than merely sell ice. Every iceman is a crusader for the industry.

I don't know where the mechanical refrigeration people get their salesmen—but they aren't ex-icemen. Icemen just don't desert the industry. Icemen regard people who buy mechanical refrigerators as erring—and somewhat simple minded—children. "You'll be sorry," is generally their parting shot when a customer backslides.

And we really hated to see our old icebox go.

Pittsburgh Day By Day

By Kenneth Spear

I KNOW now where to go when it's hot. To an ice plant.

H. Stewart Dunn, president of Consolidated Ice Co., escorted me through the South Side plant of this company to show me how ice is made.

Outside, it was sticky. He opened a door and we moved suddenly into a long room where the mercury was 34, two points above freezing. Men were pushing 300-pound cakes of crystal clear ice around.

Deep, white layers of frost hung to the ceiling joists, just like the inside of an electric refrigerator. And, as with your refrigerator, this room has to undergo a defrosting operation every so often.

In another room where the temperature was 22, underneath my feet, is the ice factory. This particular plant holds 2200 square cans. Each can holds 50 gallons of water.

Fifty-four to 60 hours later this water becomes a cake of ice. City water is used. Air is circulated in each tank to take any sediment or non-freezing chemicals out of the water.

Ammonia is circulated through a coil system, none touches the ice cake. Each tank rests in a brine solution, which is kept at the 22-degree temperature.

I peeped into the storage house. It's empty now. But in winter time, or a slow season on ice, it can hold 1000 tons of those huge blocks of ice.

From the ice-making room, we move to the spot where these blocks of ice are put through a crusher and cube-cutter.

That crusher can change the shape of an ice cake quicker than you can wink. It smashes it into three sizes. One is the fine, crushed type used for food displays—a large amount of it in markets specializing in the sale of poultry. Another form is the size of a pea or a nugget the shape of the Hope diamond.

The cuttings from the machine which cubes ice are white and fine like snow. The cutting machine I saw working can turn out 30,000 ice cubes an hour. It all works automatically. It picks up a 380-pound block of ice, cuts it once, turns it around and keeps cutting until cubes about an inch and a quarter square come out.

From the ice cutters and crushers, the ice goes by belts to the packing room. Here, in temperature of 28 degrees, the ice is put in paper bags of 50 pounds each. The bags are made of wet-strength paper and won't leak. Last year the company used about 175,000 of them.

And the paper bag is really just coming into prominent use in the ice business. Ten years ago, if you had told Mr. Dunn's father, the late Public Safety Director Thomas A. Dunn, founder of this ice business, that ice would be sold in a paper bag, he would have sent for a psychiatrist.

As a matter of fact, the business of selling ice by the cube is very young, rising from about 14,000 cubes a day three years ago to 90,000 a day now.

And for something new in the ice business, consider those vending machines. The company has one in Millvale on Route 51 near Whitehall Borough, one in Mt. Lebanon and the first one that was put up around here on Saw Mill Run Boulevard.

You put a coin in a slot and out comes ice, a 25 or 50 pound cake or a bag of ice cubes. I walked inside this Saw Mill Run Blvd. machine.

Here the ice is kept on conveyer belts. On a good hot day, or a Saturday they refill the vending machines about five times. The Saw Mill Run Blvd. machine's 25-pound belt holds 172 pieces and this machine has to be defrosted every three weeks.

And when things are going full blast, the South Side plant can turn out 150 tons of ice a day. The company's Forty-third St. plant pushes out 450 tons a day.

Ice Vending Stations Seen as Solution to "Off Season" Slumps

"ICE manufacturers and distributors throughout the nation see automatic ice vending stations and equipment as the means by which "off season" losses can be turned into profits," says Donald S. Scott, S & S Vending Machine Co., San Jose, Calif.

Recent surveys, reports Mr. Scott, prove conclusively that 27 per cent of ice sold through S & S ice vending stations is purchased by occasional ice users. This 27 per cent are sales which would not have been made unless the 24 hour automatic service was available.

Their survey, continues Mr. Scott, showed 45 per cent of all S & S ice vending ice machine sales are made between 4 and 8 p.m.—strictly "after hour" sales which represent customer buying at customer convenience.

S & S commitments for fall and winter deliveries of Sturdy-Built stations and S & S Ice Vending Machines shows definitely that this year the off season sales will be maintained and more profitably made because ice manufacturers are out to capture this 27 per cent which, heretofore, they have never enjoyed.

More ice manufacturers and ice distributors realize that this year, with additional stations in operation, winter sales can be increased by at least 27 per cent.

"These companies have found," says Mr. Scott "That by trimming truck delivery expense and selling more ice automatically there is, of course, a much greater profit per ton realized. This greater profit per ton coupled with a 25 per cent increase in sales volume is the answer to a lot of problems and is the reason why vending stations will pay for themselves out of profits earned.

Railroad Operates Ice Plant for Car Icing

THE Toledo, Peoria and Western Railroad operating out of Peoria, Ill., on a 239 mile haul between Effner, Ind. and Keokuk, Iowa is recognized as one of the most direct lines connecting east and west traffic. Hit by strikes, death and financial troubles in recent years, the road is rapidly becoming the forerunner of speedy carrier connection for bypassing the huge Chicago terminal yards, a bottleneck for rush delivery and short cartage time.

Keeping pace with its increasing tonnage is the TP&W ice plant producing 40 tons of ice daily for their refrigerator cars carrying perishable produce. Supplying the power to operate the York Ice Machines are a "Caterpillar" Diesel D8800 Engine and two "Caterpillar" Diesel D7700 Engines.

J. H. Lowery, superintendent for the ice plant records an average daily operation in the winter months at 16 hours and a 24-hour cycle in the summer.

Indiana Ice Company Appointed Distributor for Electric Iceman

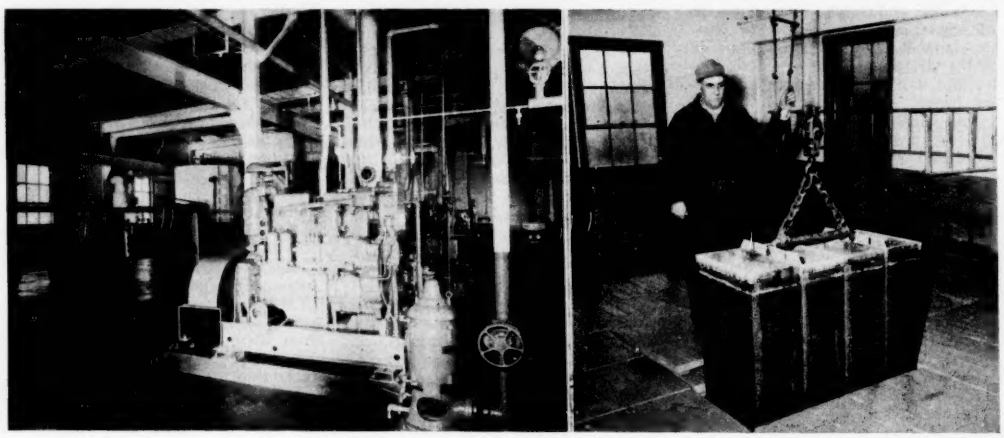
THE Indiana Ice & Fuel Co., Indianapolis, Ind., has set up an Ajax Division to sell and distribute the Ajax Electric Iceman throughout most of Indiana. Following announcement of the new activity of the ice company, Henry L. Dithmer, executive vice-president, declared that vigorous selling of the ice cuber and corresponding promotion of commercial ice sales are expected to yield the best results in both divisions of the company activity. Extensive ice manufacturing operations are carried on by the company in Indianapolis and it operates a number of plants in other cities in Indiana.

The Ajax ice cube maker was developed by the Packard Manufacturing Co. of Indianapolis. Now it is being manufactured by Servel Inc., of Evansville and distributed nationally by the Ajax Corp. of America, Chicago. The ice maker is a compact machine which produces clear ice cubes. It has a rated daily capacity of 360 pounds of ice per day. The announcement in Indianapolis newspapers stated the selling price is $895.00.

The ice maker is sold with a one-year service policy and dealers will be required to have an organization to service the machines. Since companies engaged in the bottled beverage activity have such a service set-up, Mr. Dithmer expressed the opinion that ice companies operating beverage divisions would be most interested in becoming dealers for the Ajax machine.

Ice Prices Cut for Hot Weather

ICE prices at East Liverpool, Ohio, were reduced July 30, with the mercury soaring into the 90's for the sixth day of a heat wave. The Webb Corp. announced a 20 per cent reduction in platform prices to 50 cents per 100 lbs.



Compressors and tank room of T.P.&.W. Railroad. Compressors are driven by Caterpillar engines. Superintendent J. H. Lowery operating can puller.

Ice a MUST in the Seafoods Business

ASK Joseph E. L. Suprenant, proprietor of the Avenue Fish Shop, New Bedford, Mass., and he will readily tell you, "Ice is an irreplacable factor in the seafood business because of the many merchandising advantages it holds for the retailer. Mechanical refrigeration is suitable for many other lines, and sometimes for seafood, but the really wise retailer in fish soon discovers that his disadvantages in the use of it are (1) higher cost, (2) inevitable breakdown, which though short in length, can cause instant spoilage and thus a big loss, and (3) consumer eye-appeal, which is so closely tied in with freshness and palatability of the product.

Joseph Suprenant, Avenue Fish Shop, New Bedford, Mass., can buy seafoods in bigger volume than most of his competitors, thus realizing larger savings, as a result of his ice storage.

"The last point should be re-emphasized. Fish, placed in a mechanically refrigerated display case, tends to dry quickly, and when this happens any fish retailer will agree that fillets simultaneously lose their shine. Ice however, humidifies the interior of the case as it melts, maintaining just enough moisture to 'kill two birds with one stone': (1) refreshed fish fibers, and (2) eye-catching glisten."

Boat Owners Use Ice

Suprenant agrees that some fish merchants have invested good amounts in non-ice installations, but perhaps his argument may be bolstered by the fact that recently he was a boat owner himself: "You'll find that every dragger in the fleet of 2,000 or more that operates out of Massachusetts coastal fish ports, uses nothing but ice for the protection of its catches. That example is proof enough of which type of refrigeration is best applicable to the product, a multi-million-dollar example!"

In meticulous detail, Suprenant constantly rotates and replenishes the supply of seafood delicacies in his 9-foot display case at the merchandising end of his shop. Holding a layer of crushed ice a foot deep, the case is provided with a single inverted "Y" plumbing outlet—one pipe leading to sewage, the other branching into a waste pit. Obviously such seafoods as Louisiana shrimp, which retails at 95 cents a pound, must receive the protection Suprenant feels only ice can give, if it is to be accepted by the average housewife who demands first quality in these non-denied inflationary days. And perhaps because Suprenant supplies the proper merchandising installations for maintenance of an overall quality line, he is able to admit to a steady increase that stands now at 25 per cent when compared to the first part of 1949.

But his preference for ice refrigeration is best shown by the impressive storage room he erected at the rear of the market. Standing 11 ft. high, it can accommodate 4,000 lbs. of fish. The concrete exterior is 4 inches thick, and against it lies 3 inches of cork insulation. A 1-inch, aluminum-painted wood sheathing reflects cold into the 9-by-10-ft. interior.

Crushed ice a foot deep protects fish in Suprenant's display case. "Only ice," he says, "can give seafood a glisten which makes for eye-appeal to housewives."

What clear-cut advantage does this cooler provide for Suprenant, in the face of the fact that almost every other fish retailer in the area lacks one? "It should be apparent," says the proprietor, "that if I can buy seafoods in greater quantities, I realize greater saving. But here is the most important business benefit, that saving is passed on to my customers in the form of lower prices, gaining me increased traffic, favorable word-of-mouth advertising, and resultingly increased income. The retailer who buys strictly for his display case, and who maintains no cooler for perhaps the sake of bigger ice cost, loses in the end."

Canadian Cities Import Ice

FOR the first time on record, a news report states, ice in quantities is being brought into Goderich, Ont., Canada, from the United States. Owing to the abnormal winter very little natural ice was stored as is usually done and the July heat wave completely wiped out local dealers' supplies. Two of them obtained their supplies from Stratford but at Stratford, too, the supply was so short that ice was being imported from the United States chiefly from Port Huron and some from Rochester. One local dealer has an ice-making plant of his own and makes enough to supply his customers without having to bring in any from out of town.

Ice Men Visit Industrial Exposition

Two of the ice industry's leading figures, David J. Copeland, president of the Indiana Association of Ice Industries, and Mount Taylor, executive secretary of the National Association of Ice Industries are greeted by Gertrude Grobel, display manager of the Indianapolis Industrial Exposition. Their visit to the exposition was highlighted by an inspection of the display of Polar Ice & Fuel Co., Indiana's largest ice manufacturers and distributors.

The Polar ice display features a miniature truck, ice hooks, a plastic likeness of a block of ice and some beautiful photo-murals of ice in use. The "Luxury Look" of ice is stressed in the display.

The Industrial Exposition is a permanent year 'round activity showing industrial products of the city. It is located in the Indianapolis Union Station and is sponsored by the Indianapolis Chamber of Commerce.

City Products Earnings Increase In First Six Months Period

CITY PRODUCTS CORPORATION (formerly The City Ice & Fuel Company) reports increased earnings for six months period.

William J. Sinek, President, announced net income amounted to $2,192,757, or $1.74 per share, compared to $2,075,016, or $1.64 per share last year; there was some decline in gross sales, the major portion being attributed to less seasonal demand for coal and appliances.

Improvement in earnings is accredited to the Company's aggressive diversification policy and greater efficiency in operation.

American Ice Company Reports Increase

NET income of the American Ice Co. for the June quarter ending June 30 amounted to $198,486 or 41 cents each on 416,235 shares compared to $157,962 or 23 cents each on 659,197 shares for the previous year.

American Service Reports Earnings

A SMALLER than seasonal improvement in earnings in the second quarter of 1949 as a result of unfavorable weather is reported by the American Service Co. The second quarter's net was sufficient, however, to wipe out the deficit of $258,000 in the first three months of the year. The bulk of the year's profits usually are made in the three months ending September 30, and indications are that American Service in the third quarter will easily cover its full year's dividend requirements of $185,000 on its two senior securities. The company manufactures and sells ice in 43 cities in the southern part of the country and handles appliances and frozen foods. For the six months ended June 30, the company earned $20,658 against $85,272 a year earlier. Operating expenses were trimmed by nearly $30,000 in the six months.

For the 12 months ended June 30, American Service earned $2.70 a share on the outstanding 91,627 shares of common, after setting aside $3 a share for the preferred and class A dividends. This compared with $6.55 a share in the preceding 12 months. Net sales for the first six months of this year were $2,174,118 against $2,371,107 a year ago. Ice sales decreased $200,400, while other sales showed a nominal increase. From May 1 to June 30 the company purchased 1,142 shares of its own preferred for $62,375, reducing those outstanding to 51,227 shares. The average cost was $54.62 a share. The company does not take dividend action until late in the year, making the distribution in January. The June 30 balance sheet showed current assets of $1,373,720 and current liabilities of $556,809.

Ice Carver Has Coolest Job

Acme Photo

While the rest of the town steams in the summer heat, John F. Krich wraps up in long underwear, two shirts, wool pants, overshoes, fleece-lined jacket, two pairs of gloves and goes to work. John's job is fashioning fancy figures out of ice at the City Products Co. plant at Cleveland, Ohio. Here he works on a difficult swan designed to decorate a banquet table.

Bids for Water Coolers

WITH a closing date set for September 13, bids are being accepted on 1,415 ice-cooled water coolers, five-gallon capacity, inverted bottle type, by the Chicago Quartermaster Purchasing office, Chicago, Ill.

Voy Hodge — Saleswoman Sells Ice and Appliances for Florida Ice Company

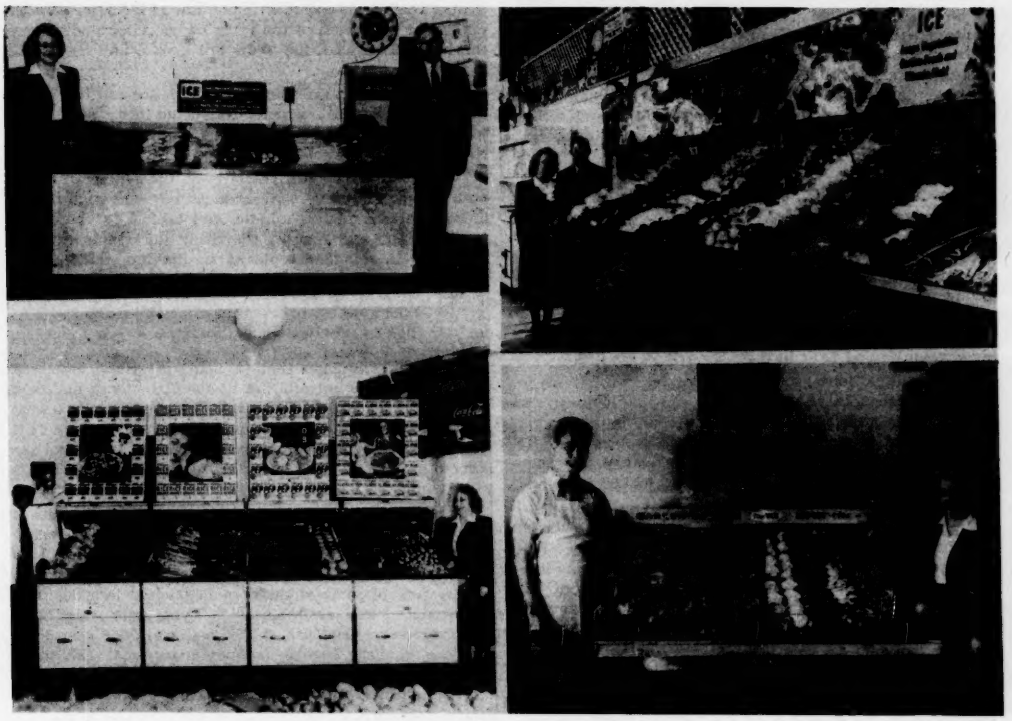
By Muriel Washburn
Secretary Florida Ice Association

THE Kilbourn brothers, owners of the Kilbourn Ice Co. in Panama City, one of the fastest growing cities in Florida, have formulated an active merchandising program to develop new outlets for the ice they make in their 100 ton plant and it is paying off. An important part in this program is being performed by Mrs. Voy Hodges. She sells ice, good will and ice appliances.

Mrs. Hodge's part in this picture started two years ago. Before accepting the position, however, she felt that she had to convince herself that the ice method was best all round for the preservation of foods, beverages and vegetables. The company loaned her an ice refrigerator, and she put it beside the mechanical already installed in her kitchen. Every day she cooked different kinds of food and put a dish of each in the two refrigerators. She noted the difference in the appearance of fruit, vegetables and other food kept in the two refrigerators and it did not take her long to appreciate the advantages of the air-conditioned ice refrigerator. After making this very complete test she sold the mechanical and now depends exclusively upon ice.

Used Picnic Chest

Believing a sales talk can be made far more convincing by a person who has actually observed the things they talk about, Mrs. Hodges then borrowed a small picnic chest from the company and filled it with crushed ice and different kinds of vegetables. She was amazed, she says, to learn how long they lasted and laughed as she told about a stalk of celery she kept in perfect condition for three weeks.



Iced Vegetable Installations in Florida. Upper left: Davis Grocery and Market, St. Andrews. Mr. Davis converted this mechanical case to the use of ice exclusively and now reports greatly increased sales and almost no spoilage. Upper right: Haney & Wilder, Super Market, Panama City, Fla. Mr. Haney had these two 12-ft. cases built by a local cabinet shop. Lower left: Lincoln Park Super Market in the heart of the negro section of Panama City... This very progressive merchant, C. F. Gaine, after being sold on the iced method for produce, discarded a mechanical case rather than trying to convert it. Lower right: Gilbert's Grocery and Market, Tyndall Field Highway, Parker, Fla. Earl Gilbert, chose a 6 ft. ice case and now regrets that he did not get a larger one. He is in prospect for another case very soon. Mrs. Voy Hodge is shown in each of the above pictures.

House to House Survey

Her first assignment on the new job was a survey of a particular section of Panama City. Down one side of a street she worked and up the other, day after day. She drew a map of every street and each house was numbered. She knocked on each door and when the lady of the house appeared she presented her card, told her she was making a survey for the Kilbourn Ice Company and asked if they used ice or a mechanical refrigerator.

If they were using ice, she talked to them about modern ice service and nearly always was able to inspect the refrigerator. In her note book she noted the information gained. If the refrigerator inspected was new she graded it A, if in fair condition B, if usable C and if deplorable she marked it D. She also asked the name of the route man, and if the customer had any complaints to make on service. Ice-users appreciated this inquiry she learned, for it made them feel the company she represented was really interested in giving them the best service possible. At the end of each day she noted the condition of ice refrigerators in every house on the streets covered.

"This type of work is very tiresome and a person must have a great deal of perseverance to stay with it, but once such a survey is made the results are invaluable," she says. She refers to her street maps frequently and makes a check on all owners of ice refrigerators marked B, C and certainly D.

Today she follows up all sales leads, even bulk ice sales, calls on prospects turned in by route men, checks the routes, and she's diplomatic enough to keep the friendship of the route men she checks, follows up all complaints and spends much of her time contacting grocers and selling them on the idea that modern vegetable icing is the best method of selling fresh produce.

Selling the Grocers

When she first started calling on grocers and telling them about the iced vegetable method she found they were not interested. But instead of becoming discouraged and giving up, she kept right on smiling and going back with more literature and the knowledge that if she could ever get that grocer to let her show him what ice could do for his vegetables and fruit he'd be her friend for life.

Finally she got one grocer to let her put crushed ice in an old beverage chest and she put some wilted carrots, beans, celery and lettuce on it. The next day she went back and the grocer met her at the door—beaming. He could hardly wait to show her the vegetables that had looked so poorly the day before, and now looked fresh and good. He was sold on ice.

She has never insisted on a grocer buying a new case if he has an old one that can be converted. She has taken fish cases out of storage rooms and converted them to iced vegetable cases, as shown in one of the pictures. She insists, however, that the case be well insulated and well drained, and even supervises the conversion.

Servicing the Grocers

She furnishes the ice and dresses the case the first day. She brings to the attention of the produce man the importance of covering the vegetables at night, keeping them well iced and the drain always open. She has sold cases from three to sixty feet (converted sections). There is one thing she does not do, and that is, forget a customer after he is sold. She goes back, ices his case until she's sure he knows how, then keeps right on calling on him at less frequent intervals, just to be sure he does not neglect to follow through on the fundamentals.

Precooling Aids Quality in Sweet Corn

UNLESS freshly harvested sweet corn is precooled before it is loaded into refrigerated trucks, a very large quantity of ice is required to get it to market in good condition, according to tests conducted by Morris Lieberman and H. A. Schomer, scientists of the U. S. Department of Agriculture.

Low Temperatures Needed

Keeping sweet corn "sweet" from farm field to city market depends largely on low temperature. When picked at correct maturity, the corn has a high suger content. This, however, turns to starch unless the corn is quickly cooled, ideally just above freezing, and held at the low temperature. The study is one of a series toward improved storage and shipping practices being conducted by the Bureau of Plant Industry, Soils, and Agricultural Engineering under the Research and Marketing Act.

The common practice now followed does not provide cooling until the corn is in transit to city markets in refrigerated trucks. Usually the growers pack the freshly harvested corn in slatted wooden crates and haul it to a central shipping point where it may be held for several hours at high temperatures before it is sold. It is generally shipped to city markets in trucks that are well insulated and equipped with a fan blower, ice bunker, and rear vents. The load is cooled with one row of block ice on edge extending the length of the truck body. After a few hours the load is top-iced, the vents are closed, and the fan is turned off.

To study cooling rates under this practice and two modifications of it the scientists conducted tests with three truck loads of unhusked sweet corn shipped from Wallace, N. C., to the Baltimore-Washington area.

They obtained detailed records of the temperatures of each shipment from: (1) Resistance thermometers inserted in cobs located in top, middle, and bottom layers of the front, center, and rear of the load; and (2) continuous recording thermometers placed in the top, middle, and bottom of the center of the load and on the outside of the truck.

Indication of Findings

The findings indicate that (1) icing practices commonly used in transit do not cool the corn sufficiently to maintain top quality; (2) cooling to desirable temperatures in transit requires nearly six times as much ice as is now used. It would be less expensive and more effective to precool the corn to at least 20° F. below field temperature before it is loaded into the trucks.

In the truck using the regular method of icing, average temperature of the corn on departure was approximately 77 F. but the temperatures ranged for different locations in the truck from a high of 88 to a low of 65 F. On arrival, temperature of some of the corn in favored locations had been reduced to a desirable 35 F. Other ears were 73 F. and average temperature of the load was 56 F., too high for good quality. Use of an open truck iced with three channels of block ice, then top iced and covered with tarpaulin proved unsatisfactory. Average temperature on arrival was 68 F.

The best results were obtained when 11,400 pounds of ice were used. This was placed 2,100 pounds in the bunker, 7,200 pounds of block ice in the body of the truck, and 2,100 pounds as layers of snow ice between layers of corn. Average temperature of the corn in this truck on arrival at Baltimore was 41 F. Evidence from the records indicates that the load reached the lowest temperature in three or four hours and maintained it throughout the trip.

Reports From Unit Ice Associations

Southwestern Ice Manufacturers' Association

By Burdette Binnings, *Assistant Secretary*

WHAT will no doubt prove to be the most forward movement yet made in ice merchandising by the Southwestern Ice Manufacturers' Association will be the Ice Merchandising Short Course to be given at A. & M. College next January. The Short Course will be under the auspices of the Association, acting through its Merchandising Committee, of which Howard Campbell of Dallas is Chairman, and of the Industrial Extension Service of A. & M. College of Texas. Like the Engineers' Short Course, the Merchandising Short Course will run for an entire week.

Sunday afternoon January 8, 1950, will be devoted to registrations, assignment to quarters, issuing and explaining text material, assignment to sections, and general preparation for the opening of the course on the following forenoon. The student body will be divided into sections of not exceeding twenty students each. In general the forenoons will be devoted to lectures and demonstrations, with the afternoons given over to conference and practice periods by sections. The only feature partaking of the nature of entertainment will be a dinner during one evening of the week. The course will end at 1:00 p.m. on Saturday, January 14, 1950.

The instructors will be drawn from the staff of experts who make up the Industrial Extension Service of A. & M. College. These will be assisted by selected graduates of the National Ice Marketing Institute established last year by the National Association of Ice Industries and presented in a series of two weeks courses in Washington, D. C.

Engineers Short Course at A. & M. College

In response to numerous demands from member companies and from engineers who could not take the course last January, the Technical Committee of the Southwestern Association has worked out arrangements through which the Engineers Short Course will be again presented at Texas A. & M. College during the week beginning Sunday, January 22, 1950. The Course will follow generally that of last January, with improvements here and there that the experiences of the last course indicated. Detailed announcement will be made later by the Technical Committee.

Texas Ice Industry Will Have Display at Retail Grocers Convention

The Southwestern Association has for the third consecutive year taken space for display of iced vegetables at the forthcoming convention of the Texas Retail Grocers' Association. The convention will be held in Galveston on September 11 through 15, with the displays and the meetings on the large Municipal Pier. Andy M. Andrich will again be in charge of the display through the courtesy of the National Association. The Association's space adjoins that of the Amarillo Iced Display Manufacturing Co., and Andy Andrich and Mel Kruse, of the Amarillo Company, will work together in building an impressive and colorful array of vegetables, demonstrating to the Texas grocers the work of ice in preserving and enriching this commodity, resulting in increased sales volume for the Grocers. Association representatives have also been asked to speak on the business program at this convention.

Texas Ice Merchandising Forum Meetings Get Under Way

Carrying out the plans for the organization of the various area groups that compose the Texas Ice Merchandising Forum, several area meetings were held in the late spring and the early summer. Because of the lateness of the season, Organization Committees for other Areas have postponed the calling of their first meetings until early fall. The meetings that have been held have been interesting and demonstrate fully the need for local and statewide organization.

Fall Meeting of Board of Directors

The Board of Directors of the Southwestern Association will meet in Dallas on September 8, at which time plans for the activities of the Association for the remainder of the year will be advanced.

Fall Conference of Engineers

The Fall Conference of Engineers will be held in Dallas, at the Baker Hotel, on Tuesday and Wednesday, October 18 and 19, 1949. The Technical Committee of the Association, under whose auspices these conferences are held, will meet early in September to lay out the program. It is contemplated the customary schedule of sessions will be followed, that is, the first session to begin about one o'clock Tuesday afternoon, October 18, with an evening session; then the sessions on Wednesday, October 19, to begin about nine o'clock in the forenoon and close around three-thirty or four in the afternoon.

1949 Convention Plans

As previously announced, the Southwestern Association's annual convention will be held in San Antonio, Texas, at the Plaza Hotel, on Wednesday, Thursday and Friday, December 7, 8 and 9, 1949. The Plaza Hotel, which has been completely redecorated, is situated on the banks of the picturesque San Antonio River. The locale presents a charming vista from any angle it is viewed.

At a recent meeting of the General Policies Committee held in the Association office, plans were adopted for again holding a three days convention. The business sessions will be held in the beautiful Ball Room on the mezzanine floor of the Plaza Hotel. The first session is scheduled for Wednesday afternoon, December 7. The Board of Directors' Dinner honoring the Past Presidents of the Association will be given on Wednesday evening, on the Roof Garden. There will again be given, at the same hour, a dinner for the wives of those attending the Board of Directors' Dinner.

The second and third business sessions will be held in the forenoon of Thursday and Friday, December 8 and 9. There will be entertainment planned for the ladies of the convention, and the San Antonio members will be hosts to the convention for an informal entertainment on Thursday evening, quite likely carried out with a Mexican motif. On Friday evening will be given the annual cocktail party, dinner, floor show and dance honoring the Association's President and his lady. Only the customary ceremonies will be carried out on this occasion, which closes the convention.

It has been several years since a Southwestern Convention has met in San Antonio. The hospitality of the San Antonio members, added to the historic and colorful

background of the region, insure a happy and an interesting occasion for the convention visitors.

In addition to the above, plans are in the making for a post-convention tour to the beautiful and enchanting "land of contracts", with destination Mexico City. The National Railways of Mexico is offering a tour allowing five days in Mexico City and vicinity, in which every place of scenic and historic interest has been included. Further details on this interesting, all-expense post-conventon feature will be supplied later.

Since early spring Texas weather has developed into a series of cold fronts, thunder showers, and generally adverse conditions from the ice man's point of view. Temperatures have been consistently lower than they have been for a great many seasons, and precipitation has been higher month by month. While other sections of the country that are consistently cooler than Texas as a rule have been sweltering in temperatures ranging around the 100 degree mark, Texas weather has been registering midday highs in the 80s, with the nights in the low 70s. Weather, together with other conditions, have resulted in sharp decreases in sales records as compared with those for the same period for the last several years.

Indiana Ice Merchandising Forum

THE initial meeting of the Indiana Ice Merchandising Forum was held Tuesday, June 28, at the Lincoln Hotel, Indianapolis. Although a very hot day, more than thirty ice company executives from over the state travelled to Indianapolis to participate in the meeting. Many valuable and constructive merchandising contributions were made by the speakers. Emphasis was placed on the necessity of a sound merchandising program to protect the tonnage gains made in the industry since 1940. L. L. Swartz, chairman of the merchandising committee of the Indiana Association, presided.

Dan Prager, director of Personnel Training and Marketing Department of the National Association of Ice Industries, talked on the National Ice Merchandising Forum and the essentials of selection and training employees, and employee-relations. He emphasized the need for increased merchandising work in the ice industry and urged all ice companies to formulate and put into effect a merchandising program in order that the tonnage gains made since 1940 might be retained. He further stressed the importance of proper personnel selection and training in doing this most important job of merchandising ice and ice-using appliances.

H. E. Young, Personnel Training Director of the Polar Ice & Fuel Co., Indianapolis, gave a talk on "The Most Important Man in your Company." Mr. Young drew heavily from his experience in the Polar Company's training program and offered very valuable advice in connection with personnel training.

David J. Copeland, president of the Indiana Association of Ice Industries, discussed activities of the "Big Ten" companies and explained their methods of promoting sales. Among methods mentioned by Mr. Copeland were successful use of fairs, shows or other public events where exhibits can be used advantageously; use of company coal customer lists for direct mailing, plugging the use of sized ice; the use of lists of customers of water softener services for direct mail promotion of sized ice.

Mr. Copeland also mentioned a unique contest now in progress at South Bend, Ind., by one of the Big Ten ice plants called "Strip Tease," an idea fostered by Al Griffee of City Ice Service, Inc. This contest, he said, has been most successful in promoting sales.

Francis Henneberger of Princeton, Ind., gave an interesting report on the icing of sweet corn. For several years Mr. Henneberger has been endeavoring to get local growers interested in the potentialities of using ice for sweet corn, and this year has been successful in getting several growers to adopt this modern method. Under cultivation near Johnston, Ind., in Gibson County, are over 200 acres of sweet corn which will be field-iced at maturity. Armed with this first hand information the Gibson County growers are prepared to go right ahead with this first effort on a large scale in Indiana.

Mrs. Harriet Gray of Polar Ice & Fuel, Indianapolis, has built up a good business in furnishing punch bowls for weddings, parties, and other events and she gave a talk on how she handled this business. She has a hand-constructed stand decorated and insulated which she rents complete with ice for these social occasions. To prevent the loss of punch caused by possible cracks in the ice bowl, a plastic liner is used.

At an open forum discussion conducted by Mr. Prager, it was brought out that a large percentage of the members of the Indiana Association have regular schedules for training employees. Several of the members responded to the invitation to describe the training programs being conducted by their company. Among the suggestions offered for increasing the effectiveness of the work were: inviting the employees' wives to attend meetings; informing the wives by letter prior to meetings as to commissions their husbands may earn by additional work.

This forum discussion period was concluded by a brief talk by Mr. Prager on the material available from the National Association of Ice Industries which was prepared for the special purpose of meeting competition of new ice cube makers.

It was announced that three additional ice merchandising forum meetings are scheduled for this year as follows: Lake Wawaussee, South Shore Hotel, August 16; Lincoln Hotel, Indianapolis, Ind., September 15; and Spring Mill State Park, Mitchell, Ind., October 13.

Illinois Association of Ice Industries

By WM. D. WRIGHT, Secretary

IN ONLY one or two instances do we know of anyone being compelled to buy ice for their needs and this was not occasioned by increased demand but to mechanical failures in manufacturing processes. In spite of the hot weather the ice business has been mediocre, lifeless, none of the great rushes usually accompanying high temperatures.

Refrigerator sales continue to lag, there is more or less unemployment in most areas, too many people sitting out their unemployment compensation, increase in time payment buying and some slowness in meeting these payments on time.

There is no special activity in Association work during August. Everyone is busy with their personal business. Come September 1 we will begin to hold the usual round of conferences and build up to our annual convention. As I see it there is a very urgent need for intensive personnel training and an active merchandising program if the industry is to hold its position. Looks to me like it is time to dust off the books that we used in the last depression to effect sales, rehearse all the time tested plans for getting merchandise in the homes of the customers, contracts, rentals, dollar down dollar a week, walk, ring door bells, talk, advertise, the old timers will remember and the new comers will have to learn. There is no substitute for work in spite of the programs and teachings that have gained prominence in the political thinking the past twelve years.

Canadian Association of Ice Industries

By Kenneth C. McCrea, Secretary

HIGH temperatures setting new weather records for many years hit Ontario during July and sent ice sales soaring to record figures. All dealers, large and small were taxed to the limit to supply the demand. In most cases this was accomplished but in a few natural ice areas which had been unable to put in a full supply of ice last winter and were depending on nearby ice manufacturers to supply them, it was necessary to curtail or discontinue service temporarily. The drain on ice storage was such that present stocks are now where they would normally be about five or six weeks later in the season.

The Canadian Association of Ice Industries in conjunction with the Toronto Ice Dealers' Association has reserved display space at the widely attended food show to be held at the Royal York Hotel, Toronto, on October 3 and 4. Vegetable icing will provide the main feature of the display which will be staffed jointly by members of the sized ice commitee and the Toronto Ice Dealers' Association.

The next Canadian ice convention which would normally be held during March or April of next year has been moved ahead to November 8, 9 and 10 of this year. It will be held at the General Brock Hotel, Niagara Falls, Ontario. The convention committee is now at work planning a program which will provide plenty of meat for those who desire ice business help and every opportunity to enjoy the scenic beauty of this wonder spot of nature.

Indiana Association of Ice Industries

By Robt. Walton, *Secretary*

DESPITE the fact that the Indiana ice industry has been enjoying an extremely hot summer, tonnage reports indicate that most companies are experiencing decreased sales of ice as compared to 1948, which was generally considered a poor year as far as the weather was concerned. It would be difficult to determine the exact reason for this decline in sales, although probably part of of it might be attributed to general business conditions.

Refrigerator sales are off somewhat, but in instances where companies are doing an aggressive job of merchandising it has been proven that ice-using appliances can be sold in quantities.

Our work with Purdue University in the field of sweet corn icing is beginning to pay dividends. We can now point to over 600 acres of sweet corn that has been or is being iced in Indiana, and it is felt that the research and promotion efforts on the part of Purdue will result in much more activity in produce icing in another year.

Indiana ice companies are quite naturally concerned about the new competition that is threatening their business in the form of automatic ice cube machines. To meet this competition they have been holding frequent meetings to work out comprehensive sales plans.

District Meeting Discusses Ice Makers

A DISTRICT meeting of the Indiana Association of Ice Industries was held at Evansville, Ind., Friday evening, July 8, called to discuss the competitive threat of the new automatic ice cube maker being manufactured in Evansville. An interesting and timely discussion was held and it was pointed out that in order to successfully meet this competition, the ice companies in the area affected must join together and develop a sound program of merchandising.

Ohio Association of Ice Industries

By Guy W. Jacobs, Secretary

THE ice season got away to a late start this year, just as it had done for the past several years, but with the advent of summer weather late in June it has held right on. Reports from all sections of the state would indicate that business has been good and, although the demand has been unusually heavy in some localities, be it said to the credit of the industry that there have been no reports of any existing shortages.

The indications are that summer weather will continue for some time. Several of our members have extra ice and would be willing to dispose of it to their fellow icemen if it should be needed. The Association will be glad to assist those members, if any, who may find it necessary to purchase ice later in the season if they will take the trouble to inform us of their needs. Also, if you are one of those members who may have some surplus ice available kindly let us know where it is located and about how much you could spare. By having this information on file in this office anyone who may find himself temporarily short of ice will be able to locate a supply.

The Association is making plans to have an exhibit at the Ohio State Fair to be held August 27-September 2. As one of the regular exhibitors at this fair, we were given the opportunity of occupying our usual spot in the Columbus Building. The exhibit, as has been customary for the past several years, will be in charge of Wm. R. Cunningham, a member of the Merchandising and Research Committee. The details have not yet been worked out but it is planned to have all types of ice-using equipment in the booth and ice in all of its beauty and attractiveness for every refrigerating need will be the central theme.

At the end of the seond month of the safety campaign the industry was still showing an improvement over the experience of last year. Both the frequency and the severity rates were down. The frequency rate for all groups showed a reduction from 49.6 to 36.0 and the severity rate a reduction from .0857 to .0742.

It is gratifying to note that each of the three groups showed an improvement in frequency and in group "C", those companies with more than 25 employees, the severity rate also showed an improvement. Another item worthy of comment is the fact that for the first two months the number of man-hours reported this year was slightly greater than the man-hours for last year.

New England Ice Association

THE New England Ice Association outing will be held Thursday, September 22, at Lake Pearl Park, Wrentham, Mass. The Association will have the exclusive use of the park. A spacious dining room is available for dinner and entertainment and a recreation field for baseball and other games. The Attleboro Ice Co. has challenged the rest of the Association for a regular ball game, not softball—each player to supply his own equipment. Ed. Kinney and Charlie Perkins of Boston Ice have issued a challenge to any other team for horseshoes. President Thacher is donating a large cup which will go to the company which scores the most points for the day. Other prizes will be awarded to winners of each event.

Missouri Ice Merchandising Forum

A MEETING of the Missouri Ice Merchandising Forum will be held Tuesday, October 4, at the Missouri Hotel in Jefferson City, Mo. The meeting will start at 9:30 a.m. and is scheduled to adjourn at 4:30 p.m. An interesting program will be presented.

The Practical Refrigerating Engineer

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Steam Boilers and Boiler Plant Auxiliaries

By C. T. Baker

Consulting Engineer, Atlanta, Ga.

THE subject of steam boilers and their auxiliaries is one that could be discussed, at length, without doing other than scratch the surface, since the multiplicity of types and designs as well as the wide range of operating conditions required to be met in our present day industrial life, precludes an extended discussion here of the Arts and Science of producing and using steam.

The speaker is not unmindful of the fact that those of you who desire to explore the subject of boiler plant design and construction have access to voluminous literature dealing with all types steam generating equipment ranging from low pressure heating boilers, supplying saturated steam at gauge pressures of 15 lbs., and less to the great steam generators of the modern central station plant, many of which supply superheated steam at pressures ranging from 800 to 2000 lbs. gauge and at total temperatures of 900 to 1000 degrees, F.

A typical example of this tendency is reflected in the latest steam generator now on order for the New Jersey Power & Light Company, at Milford, N. J., which is designed to produce 650,000 pounds of steam per hour, maximum rating at 1275 pounds pressure and 960 degrees F., total temperature.

This great steam generator will be fired with pulverized coal and will be a three drum unit with three stage superheaters and finned fuel economizers. In this discussion, I shall confine my remarks to the types of boiler plant installations that I believe will be of greatest interest to members of this organization; namely, those types of installations that are in use in the ice and cold storage and allied industries.

I shall also devote some time to the discussion of that phase of boiler plant operation which I consider to be particularly appropriate in these days of constantly rising operating costs; namely, overall boiler plant efficiency. My work takes me into industries other than that of refrigeration and ice manufacturing operations. A few of these are: hotels, laundries, dry-cleaning plants, municipal power plants, and some textile plants.

I have emerged from many boiler plants in all of the above-named operations asking myself this question: Has there been any real improvement in boiler and furnace efficiency in the past quarter of a century? We know, of course, that there has been a decided improvement in this time, but, by the same token, we also know that this improvement is not by any means general.

We know, for example, that there are thousands of small and medium-size boiler plants being operated at unbelievably low efficiencies; plants that are hourly wasting great quantities of valuable fuel that should never have been wasted. In view of this state of affairs, it does not seem out-of-place, for the speaker to exercise a grandpaw's prerogative and to scold a little.

Type of Boilers

Most of the steam generators in general use in industry, office buildings, hotels, textile mills, et cetera, exclusive of those operations that call for large quantities of steam at fairly high initial pressures, are the horizontal return tubular boiler, the small capacity water tube boiler and the self-contained steam generator, a type that has found wide acceptance in localities, where either natural gas, or fuel oil may be had at reasonable prices.

The self-contained type is fully complete with all automatic controls, feed pump and safety devices and built in many sizes up to and including 500 h.p. This type requires no brickwork, or steel suspension members, as do other types and is, therefore, easy to install. Since the fuel used is either gas, or liquid, the full automatic controls and the air-tight construction together with close draft regulation, insure high overall boiler and furnace efficiency of these units and, because of this, very little manual attention, or adjustment, is required.

The Return Tubular Boiler

Probably no type of steam generator that has appeared, since the days of James Watt, has been more universally used in industry, than the H.R.T. (fire tube) boiler. Built in many sizes by several manufacturers, this type boiler has been fired with many fuels; solid, gas, and liquid. Such boilers, when correctly set and provided with a few simple controls, such as, automatic feed water regulators and draft control, will develop a suprisingly high overall boiler and furnace efficiency.

Boilers of this type are built in sizes ranging from 48 in. diameter by twelve feet long to 90 in. diameter by twenty

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feet long and, in accordance with the latest A.S.M.E. boiler code and the laws of various states. Boilers of this construction, when properly operated and protected by practical safety devices are recognized by boiler insurance companies, as excellent risks and are, therefore, easily insurable.

H.R.T. boilers may have their furnaces arranged for burning gas, liquid, or solid fuels, as local conditions and fuel prices may warrant. Coal, for example, may be burned in hand-fired furnaces, or stoker-fired and where the setting permits, pulverized furnaces may be used should pulverized coal-firing be economically advantageous. However, low settings and limited furnace and combustion chamber volume are not suitable for this method of coal burning.

Often, the problem of smoke is a serious one, particularly in cities having rigid smoke ordinances. Hand-fired coal furnaces are often serious offenders because of the character of coal that must be used. This condition may often be improved by introducing secondary air over the fuel bed through an adjustable opening located in the firing door, or by a type of fire door, designed for this purpose.

Secondary air may also be introduced by means of a steam jet. Many steam jet installations are in operation in some sections of the country that are reported to be doing a good job of preventing excessive stack-smoking.

Recently, one large railroad has been using this method on their switch engines and report satisfactory results. This method is not new, it has been used from time to time, for some forty years, in connection with hand-fired H.R.T. boilers and in more recent years, some application of steam jets have been made to stoker-fired furnaces. The question of secondary air for furnaces is referred to, later in this discussion.

Steam Superheaters on H.R.T. Boilers

Steam superheaters may be installed on H.R.T. boilers, if desired, since the market now affords such equipment. One company supplies what is known as the Girth Seam Type Superheater, which may be applied to any H.R.T. boiler. It is fastened to the boiler shell by means of heavy supporting rods with the bank of tubes located in contact with the shell and in the path of the hot combustion gases. In this type, saturated steam from the outlet nozzle of the boiler is delivered to the inlet header of the superheater, is superheated in passing through the tubes and is piped from the outlet header to the steam header. A safety valve protects the unit against over-pressure.

It is well known, of course, that superheated steam has many advantages in certain applications over saturated steam, such as reducing steam consumption in steam engines and steam turbines, reducing pipe line condensation losses, and it considerably increases boiler efficiency.

Water Tube Boilers

The water tube type steam boiler, long familiar to all of you is not new, in fact, this type steam generator can trace its ancestry back some 183 years to John Blakley, who in 1776, secured a patent on such a boiler. Later, an American inventor, James Rumsey, in 1788, patented in England, a type of water tube boiler that gained considerable favor.

Still later, in 1805, another form of water tube boiler was patented by John C. Stevens, and so, on down through the years, the water tube boiler continued to be developed and to gradually, but surely, make for itself a permanent place in the field of steam generation. This fact is reflected in the large capacity, higher steam pressure and steam temperature generator of the mammoth central stations of today.

In recent years, builders of water tube boilers have placed on the market, a boiler of this type intended to compete with the fire tube type steam generator. This has been accomplished by offering a water tube product, designed to fit the requirements of those who are in the market for capacities of 200 to 300 h.p.

Boilers of this capacity have proven very satisfactory and possess many advantages. We might profitably consider now some of the things that engineers in charge of steam plants should keep in mind concerning the operation of such plants. It is unfortunately true that the average small and medium-sized boiler plant found in many industries is being operated at very low overall efficiencies.

Low Efficiency

During the past several years, the speaker has made surveys of a great many boiler plants which have included, hospitals, laundries, factories and other industries and has found that a surprisingly large number of these installations were wasting fuel, totaling hundreds of dollars annually and this largely because of laziness, ignorance, or indifference on the part of the man, who should have made it his business to so maintain his boilers and to so operate them that they would approximate the maximum operating efficiency possible with the type of equipment installed.

Investigations, which the speaker has made in the number of such plants, have shown two major causes for low overall boiler and furnace efficiency; these are, excess air and abnormally high flue gas exit temperatures. Of course, where excess air is found in large quantities, CO_2 readings are low. Generally, the excess air occurs with hand-fired furnaces where there is lack of proper draft control and where the boiler brickwork is in such state of repair as to allow cold air from the outside to enter the furnace and combustion chamber in large quantities; air which soaks up valuable heat and carries same to the stack and to waste.

Some operators, upon reading the temperature of the flue gases, leaving the heating suraces of their boilers and finding it to be low, make the serious error of assuming that this indicates good performance; as a matter of fact, it may, or may not, indicate good performance. For example, if the brickwork around a H.R.T. boiler, or any other type of brick-set boiler, is full of holes, then the cooling effect of the large quantities of cold air that enters the settings through these holes will produce a low exit temperature of the flue gases, which, obviously, would be most misleading. On the other hand, if the brickwork is tight and the draft properly controlled, the flue gas temperature will be found to be much higher than in the example just cited, but the total heat wasted is much lower since the weight of the heated gases in one case is much lower and, therefore, the total heat carried away is much less than in the case of boiler operating with tremendous excess air and carrying away thousands of heat units, but at a lower temperature level.

There are exceptions to the above statement concerning stack temperatures. Suppose that the setting was as near air-tight as possible to make it and with no cold air entering around the stack breeching, or in the case of the H.R.T. boiler, around the flue doors and that all excess air enters through and over the fuel bed, then, in that event, much of the heat that would normally be absorbed by the water in the boiler would be absorbed by the excess air with a consequent rise in stack temperature.

How Much Air

There can be no denying the fact that one of the major causes of fuel waste is that which stems directly from excess air; that is, air that is introduced into the furnace and combustion chamber over and above the theoretical amount required to insure complete combustion of the fuel being

burned. The exact amount of air needed will always exceed the theoretical amount required for complete combustion of coal, or other fuels. This will amount to from thirty, to fifty percent.

Different authorities are not all in agreement on just how much air is required to insure complete combustion. Some have held that 12 pounds of air per pound of coal is the theoretical amount required for this form of solid fuel, while others held that 16 to 18 pounds of air are theoretically required per pound of coal.

One authority has suggested that since the analysis of different coals vary over a considerable range, a better yardstick to use in determining the quantity of air required is, pounds of air per 10,000 Btu. Coal requires something like 7½ pounds of air per each 10,000 Btu. liberated, while liquid fuels usually require somewhat less; 7 to 7.04 pounds of air per 10,000 Btu. liberated and about 14 to 14½ pounds of air per pound of liquid fuel.

Since coal, for example, is not all carbon, but includes several other ingredients, such as, ash, sulphur and water, we cannot assume that coal is 100 percent carbon and, therefore, that the theoretical air requirements for complete combustion are those of pure carbon and that 2.67 pounds of oxygen, or 32 cubic feet at 60 degrees, F., required per pound of pure carbon for complete combustion will suffice for a pound of coal.

We might conceiveably project this discussion of combustion air requirements into infinity and still not suggest any practical methods to the engineer in charge of a boiler plant for building up overall furnace and boiler efficiency. In the following discussion, an effort is made to treat a few of the more important factors that must be kept in mind if we are to operate our boiler plants efficiently. It refers particularly to coal fired furnaces.

Keep the Excess Air at a Minimum

It has long been recognized that excess air, in quantities beyond the actual requirements, when passing through the boiler setting will cause excessive fuel losses. The question is sometimes asked, How can I find out about this "so-called" excess air and what can I do to counteract the work of this *fifth column* in the boiler room.

The answer is, acquire a few simple instruments and use them to find out just what is going on around the place! A differential draft gauge, a stack thermometer, and a portable CO_2 machine will be all that is needed to begin with, since, if these are properly used and the facts made available by such instruments accurately analysed, the possibilities for fuel saving indicated by their use will often times surprise you.

The first thing usually checked is the CO_2 in the flue gases, just as they leave the water-heating surfaces of the boiler. Here you may get a surprise that will shock you. Suppose you found, after making several tests, that you were operating with a CO_2 of say, 7 per cent. From a table developed some years ago, by the late Joseph B. Hayes, an outstanding authority on combustion, which showed the excess air and preventable fuel loss for various CO_2 values, we find that 7 per cent CO_2 represents a preventable fuel waste of 18 per cent and that the excess air amounts to 195.7 per cent. That is very bad performance, indeed, and yet, I have found many boilers operating at 7 per cent CO_2 and some even lower. Generally, it has been found that such low CO_2 values are directly traceable to openings in the brickwork, including side and end walls and, in the case of the H.R.T. boiler, air leaks around the rear arches and along the top of the side walls, where the brickwork makes a joint with the boiler shell.

If now, you will go over your boiler settings with a lighted tallow candle, you will find cracks, both large and small, where the cold air is entering, just watch the flame of the candle and see how quickly it, too, is pulled into the opening. You may find, also, that the stack is overloaded by this large quantity of heated air that it must handle, and because of this overload, there is insufficient draft. By putting someone to work, closing all large holes and cracks by caulking with asbestos rope and continuing the use of the candle, it will soon be found that less stack draft is required, that the stack damper, in the case of the hand-fired boiler, may be partly-closed and that less fuel is being fired. Invariably this procedure will produce the desired results.

How Much CO_2

The engineer, while striving to maintain a high CO_2 in the flue gases by keeping the excess air as low as possible, consistent with good overall boiler and furnace performance, must keep in mind the fact that there is a limit, beyond which he can not go without sacrificing efficiency.

Reduction of excess air results in an increase of furnace temperture, which, from the standpoint of combustion efficiency, is excellent, but often presents a serious problem of maintenance of furnace linings and refractories, generally. This usually results in an increase of clinker formation and, in the case of stoker-fired furnaces, an increase in stoker parts replacements.

It is also true that when the air supply is reduced below the theoretical requirements, incomplete combustion will result; this is usually followed by the appearance of excessive smoke at the stack exit. Generally the goal to strive for is to handle your operations to maintain a CO_2 of 12 to 14 per cent. Then you will be holding your losses to a satisfactory minimum, since at 12 per cent, the preventable fuel loss, as determined by Hayes, is only 4 per cent, which is not bad, all things considered.

With 14 per cent CO_2, the preventable fuel loss is 2 per cent, while the excess air is 47.8 per cent. Anywhere in the range from, say 11 per cent to 14 per cent CO_2 will insure good operating efficiency, but these values should be constant and not occasional. If there was no excess air present in the flue gases, as they left the heating surfaces of the boiler, the CO_2 would be 20.7 per cent, but, of course, this condition even if possible to attain would not be at all desirable because of the many disadvantages that would result.

A very handy formula for determining the excess air present, when the CO_2 percentage is known is stated, as follows:

$$\frac{20.7 - CO_2}{CO_2 \text{ percent.}} = \text{Excess Air.}$$

Example: Suppose the CO_2 was found to be, say, 10 per cent, then,

$$\frac{20.7 - 10. \times 100.}{10} = 107 \text{ per cent, excess air.}$$

In concluding the discussion of boiler and furnace efficiency, as influenced by CO_2 and excess air, it can be accepted as a proven fact that a good CO_2 machine and a draft gauge, in the hands of a careful operator will produce economic results in the boiler plant that, will in many situations, be astounding.

Stack Temperatures

All will agree that when the temperature of the gases leaving the heating surfaces of a boiler, superheater, or fuel economizer is many degrees higher than the steam temperature, there is something radically wrong. Boilers not equipped with steam superheaters, or fuel economizers can waste great quantities of heat to the stack and even with fuel economizers and steam superheaters, stack losses can be and, often are, quite high, due to neglect to maintain

the steam and water heating surfaces, free of scale, soot, and fine ash deposits.

The two principal causes of heat losses to the stack are: Scale on the water side of the tubes and fly ash and soot on the fire side. There is absolutely no way, by which the losses resulting from such conditions may be controlled, other than by the use of good steam, or air blowing equipment for removing soot and a boiler cleaning program, coupled with the use of water-treating facilities, for removing scale-forming soluable solids from the feed water. Water-Conditioning Equipment may be had that will remove these troublesome solids and supply water that is practically scale-free.

I am not condemning internal treatment of boiler water by the addition of certain boiler compounds. Some of these have been found effective and have proven satisfactory over periods of time. Others have been merely a crutch, doing a little good for a little time, but providing no permanent cure for the ills, resulting from the use of scale-forming waters.

Scale-Formation Costs Money

It has long been known that scale on the water surfaces of boilers takes a heavy toll in fuel, but we seldom realize just how much this amounts to, until we examine some authentic data, setting forth just what scale actually does to the fuel bill. The table below gives the data, as developed some years ago, by the Engineering Department of the University of Illinois, and shows what scale can do to defeat economical production of steam:

ANALYSIS OF SCALE ON WATER SURFACE OF BOILERS

CHARACTER OF SCALE	THICKNESS	COMPOSITION	LOSS
Hard	1/50 In.	Mostly Carbonates	9.4 Percent
Soft	1/32 In.	Mostly Carbonates	7.2 Percent
Hard	1/32 In.	Mostly Carbonates	8.5 Percent
Soft	1/25 In.	Mostly Carbonates	8.0 Percent
Hard	1/25 In.	Mostly Sulphates	9.3 Percent
Soft	1/20 In.	Mostly Sulphates	11.1 Percent
Hard	1/16 In.	Mostly Sulphates	10.8 Percent
Soft	1/16 In.	Mostly Carbonates	11.0 Percent
Soft	1/16 In.	Mostly Carbonates	12.4 Percent

In view of the facts, shown in the above tabular, data plus the facts, as developed and published by many other competent investigators, we would presume that such knowledge would have been applied by all of those in charge of boiler plant operations to the end that the losses resulting from scale-formation would be reduced to a minimum, by the employment of practical methods and equipment. Yet, we know that this is not the case and that thousands of dollars are lost annually in this country that may be laid directly to the presence of scale in steam generators.

Magic Powder

The author is sometimes asked for an opinion, concerning the value of a black powder that has been sold for several years, as a soot remover, in lieu of a steam, or air soot blowing system, or a hand tube scraper. My answer has been that, wherever the products of this burning powder come in direct contact with soot-covered surfaces, the soot largely disappears and is pulled out to the stack.

I also advise that this material is no substitute for mechanical, or hand cleaning and that it can only do a part of the job at best, since it cannot be expected to reach all soot-covered surfaces in boilers, other than those of small size, like, for example, the small, vertical fire tube type boiler. I also advise the inquirer that he can produce the same results with *common salt*, as he can with the black powder—they both produce chlorine gas, when burning in the furnace which is the agency that causes soot to do the "disappearing act"!

For your information, I am tabulating the analysis of one of these 'magic" products. Below the tabluation is Webster's definition of Sodium:

CHEMICALS USED IN MANUFACTURING SOOT DESTROYER:

Water	3.%
Sodium	82.90
Silica	.76
Iron and Aluminum oxide	1.90
Zinc Oxide	8.52
Sodium Carbonate	.48
Calcium Oxide	.49
Undetermined matter	1.95

Sodium: "A soft, waxy, silver white metallic element of the small alkali group, occuring abundantly (always combined) as in common salt, soda niter, (Chile saltpeter) trona, borax, gluberite, albite, etc. Salts of it are found in the animal body, especially in the fluids, and in most plants. Metallic sodium was first obtained by Davy in 1807, by electrolysis. Chemically sodium is univalent, forming a large and important series of soluble salts. It and its components impart an intense yellow color to flames."

Keep the Surfaces Clean

We know that if we are to hold stack losses to a minimum, we must keep the heat-absorbing surfaces clean on both the water and fire side. To do otherwise, is to sacrifice large quantities of heat to the stack.

It has been demonstrated that for each twenty (20) degrees the flue gas temperatures are reduced by keeping the heat-absorbing surfaces of the boiler in clean condition and the CO_2 at the practical maximum, a saving of approximately one percent of the fuel will be realized; this is worth struggling for.

Don't Skimp on Furnace Volume

One of the reasons for the poor showing made in many boiler operations is that of insufficient furnace volume, resulting from improper setting. I have observed hand-fired H. R. T. boilers set within 36 inches off the grates and, in some instances, less than 30 inches. The bridge wall of some of these boilers is built within a few inches of the bottom of the shell and a long brick ramp extends from the top of this wall to the clean-out door of the combustion chamber. This, apparently, is a practice handed down from earlier installations, in an age when we were told that a high bridge wall was necessary to make "the flames hug the shell," while the long ramp in the rear was necessary to an easy-cleaning of the combustion chamber.

The fallacy of providing any means for making the "flames hug the shell," will be evident from a simple application of common sense to the problem. First of all, we are striving to obtain complete combustion. To accomplish this we cannot expect to discharge the products of partly-burned fuel in the form of a hot gas against a colder surface, the boiler shell, and expect these gases to continue to burn and liberate heat. Just the opposite occurs for the simple reason that the relatively cool shell of the boiler reduces the temperature of the gases actually coming in contact with it, with the result that they never again reach a temperature sufficiently high to produce combustion and, therefore, pass out to the stack in the form of unburned hydrocarbons. This, like incomplete

combustion from any other cause, represents a distinct loss in fuel.

It is a little difficult to name an "exact figure" for furnace volume for hand-fired H.R.T. boilers, but, generally, if such boilers are set not closer than 48 inches above the grates, this will provide a combined furnace and combustion chamber of sufficient capacity for burning most grades of coal available throughout the South and Southwest. However, this type of boiler has often been set higher, 5 to 7 feet above the grates with highly satisfactory results.

H.R.T. boilers located 48 inches above the grates, as a minimum, will permit of very satisfactory burning of both oil and natural gas.

As to powdered coal, most authorities have placed, as a minimum, 1 cubic foot of combustion space for each 3 pounds of coal burned per hour, with a furnace temperature of 2000 degrees F.

Feed Water Heating

Under the head of boiler plant auxiliaries, we might consider the feed water heater as one of the important ones, along with the boiler feed pump. The practice of preheating water before delivery to the boilers, known as feed water heating, is not new and I am sure that many of you have practiced this for many years. As is well known, there are two distinct types of feed water heaters; one the open type and the other, the closed type. Either are satisfactory for use with exhaust steam from steam engines and steam-driven water feed pumps, or other steam using equipment, which, normally, would exhaust to the atmosphere.

One of the difficulties sometimes experienced with the open type feed water heater is that of the feed pump becoming steam bound and losing its prime. Experience has shown, however, that if the open type heater is brought high enough above the center line of the feed pump, regardless of the type of pump used, no difficulty will be experienced in handling water as high as 205 degrees, F. The trouble experienced is caused by a drop in absolute pressure at the inlet of the pump, which produces flash steam, due to the evaporation of some of the hot water, followed by failure of the pump to maintain its prime.

Wherever there is sufficient head room available, it is recommended that the bottom of such heaters be placed at a minimum of 6 feet and, preferably, 8, or 9 feet above the center line of the boiler feed pumps.

Deaerating Feed Water Heater

Beginning in the early 1920's, there appeared on the market, a new type of feed water heater that was destined to become an important adjunct to steam generation; this is known as the deaerating heater and is designed to remove air, CO_2 gas and other gases, largely responsible for corrosion and plate embrittlement. This comparatively new type of heater has proven to be one of the real advances in the art of heating and degasifying boiler feed water.

In certain areas of the country, water from streams has been found to contain ammonia in quantities sufficient to be a serious contributing factor to maintenance of valves and piping of the steam system. Where such waters are encountered, it is possible to have provision made in the design of the deaerating type feed water heater for removing the ammonia content of such waters.

Wherever possible, the oxygen content of the feed water should be held to Zero, as determined by the Winkler method. However, the usual practice is to hold the oxygen in solution in the water leaving the heater (the effluent) to 0.02 cubic centimeters per litre. This should be the maximum. The water should also be free of dissolved carbon dioxide and of inert gases.

Value of Feed Water Heating with Waste Steam

In general, it may be stated that a saving on 1 percent of the fuel can be made for each 11 degrees F., increase in the feed water temperature with exhaust steam, or other forms of waste heat.

It will require 1 pound of exhaust steam for each 6 pounds of feed water heated from 50 degrees to 208 F. This represents a total of 7 pounds of feed water for each pound of exhaust steam. With water heated from 50 F., to 208 F., the boiler horsepower, or steam output rate will be increased 15 per cent.

Wherever exhaust steam containing lubricating oil is supplied to the open type feed water heater, it is quite necessary to make provision for removing such oil before the exhaust reaches the heater, as, otherwise, oil will enter the boiler with the feed water and usually will cause trouble.

It is also advisable to install an oil separator on the exhaust lines, even though the closed type feed water heater is used, in order to prevent the accumulation of oil on the heating surfaces; thereby, reducing the capacity of such heaters to raise the temperature of the feed water to the highest point.

Feed Pumps

The type of feed pump to use in any given situation will depend upon local conditions and whether or not without a steam-driven feed pump, there would be sufficient waste heat for heating the feed water external to the boiler. In many of the smaller plants, the outside pack duplex steam pump has proven highly satisfactory. In other situations, the electrically-driven multi-stage centrifugal pump is employed and, in fact, some plants install one of each; operating them so as to maintain the highest possible overall heat balance.

In some of the larger installations, it is quite possible to have the motor-driven and turbine-driven pump combined in one unit; this also lends itself to the maintaining of economic heat balance. Each individual case calls for special study, in order that the engineer may arrive at the most economic type of equipment to install for feed water heating.

It might not be out-of-place here to emphasize the value of Feed Water Regulators; of which there are many types available, and which will pay for themselves in a very few years operation.

Continuous Blow-Downs

In bringing to a close this treatment of the subject of "Steam Boilers and Boiler Plant Auxiliaries," which, as mentioned in the beginning, can only "scratch the surface," I would like to discuss just briefly the continuous blow downs, which have gained favor during the past few years and which may now be installed on small boilers; both of the water tube and fire tube type, as effectively as in the case of the much larger steam-generating units.

By means of the continuous blow downs, the concentration of the water in the boiler can be held within safe limits—1500 parts per million, or less, and will insure that, at no time, will the concentrated solids reach a total likely to cause damage to the boiler.

We are all familiar with the periodic blow down of our boilers by means of the usual hand-operated blow-off valve; this is fine, so far as it goes. However, it is not possible to hold the concentration down to safe limits by this

method, except by very frequent blow-down. This always results in a greater waste of heat being blown to the sewer, with no chance for any to be recovered.

The continuous blow-down not only maintains the boiler water at safe concentration levels, but, at the same time, recovers a great portion of the heat removed from the boiler by the use of flash tanks and continuous heat exchangers. The continuous blow-down of boilers will save both water and heat over the hand methods.

To those of you who are seriously interested in this phase of your operation, it is recommended that you give serious study to this latter practice in the art of steam production.

N.A.P.R.E. Question Box

NOTE: H. G. Venemann, Chairman of the Educational Committee, has agreed to answer through this column all questions asked by members of the N.A.P.R.E. Please send your questions to him care of Purdue University, West Lafayette, Ind.

Mercury Manometers

Question No. 820: Is there any question of safety in the use of a mercury manometer pressure gauge on the suction side of ammonia systems? I have heard that over a period of time the mercury may react with the ammonia to form an explosive mixture.—L.D.F.

ANSWER: I have discussed this question with Prof. G. B. Bachman, one of Purdue's eminent chemists with particular experience in explosives, who assures me that there is no normal reaction between ammonia and mercury that would produce an explosive mixture. He suggested that if any reaction did occur due to the presence of oil or other impurities, the mercury would turn dark at the meniscus, thus warning that it was time to clean the manometer.—H. G. V.

Locker Room Temperature

Question No. 821: In our locker plant we have one room 36 x 12 x 12 ft. high insulated with 6 in. of corkboard. It is refrigerated by an 1¼ in. pipe coil 480 ft. long. The room contains lockers and the door is opened about 50 times a day. We have two twin cylinder ammonia compressors: a 3 x 3 and a 2¼ x 2¼. The plant has four rooms, each with a separate set of coils with thermostat and solenoid valve. My trouble is that when the rest of the locker plant is down to temperature and the machines are pulling on this room the back pressure goes down as low as 10 in. vacuum in order to bring the room down to 4 F. and that is the best it will do. What remedy do you recommend—M.L.S.

ANSWER: In order to discover the real cause of the trouble we must attempt to estimate (1) the actual load on the coils, (2) the capacity of the coils, and (3) the capacity of the two compressors. None of these can be done with true accuracy but a reasonable estimate can be made of all three items.

I estimate the heat losses through the insulation including the air to be cooled when the door is opened to be about 9500 Btu. per hour. In making this estimate I use the following figures:

Area of walls, ceiling and floor, 1822 sq. ft.
Average outside temperature, 90 F.
Inside temperature, 0 F.
Overall heat transfer coefficient of insulation, .042 x 1.15 Btu. per hour, degree, sq. ft.
Miscellaneous heat losses, 20 per cent.
(See lesson 19 Refrigeration Theory and Application).

This does not include any product losses, since the goods are frozen when placed within the room.

Table 1 shows the rated capacity of a 1¼-in. coil 480 ft. long at temperature differences ranging from 14 to 42 degrees F, with some frost accumulation, and with all of the coil surface in operation.

Table 2 shows the rated capacity of the two twin cylinder compressors at various suction pressures when operating at 400 r.p.m. These values are based upon an average of several tables at my disposal, and may differ from some particular manufacturer's ratings by as much as 15 per cent.

TABLE 1. CAPACITY OF 1¼-IN COIL, 480 FEET LONG

Area in sq. ft.	x U	x F	x temp. diff.	=	Btu. per hour
208	2.12	.8	14	=	4970
208	2.39	.8	18	=	7180
208	2.57	.8	22	=	9430
208	2.70	.8	26	=	11700
208	2.80	.8	30	=	14000
208	2.85	.8	34	=	16150
208	2.90	.8	38	=	18350
208	2.94	.8	42	=	20500

TABLE 2. CAPACITY OF THE TWO COMPRESSORS, BTU. PER HOUR

Suction		Discharge	Capacity
Psig.	Temp.	Psig.	Btu. per hour
10*	-42.1	185	7200
8*	-38.9	185	8400
6*	-35.9	185	9600
4*	-33.1	185	10800
2*	-30.5	185	12000
0	-28.	185	13200
1	-25.6	185	14400
2	-23.4	185	15600
3	-21.2	185	16800
4	-19.2	185	18000
5	-17.2	185	19200

* Inches of mercury below one standard atmosphere.

Observations: From Table 1 it is seen that the normal coil capacity is greater than 9500 Btu. per hour whenever the temperature difference is more than 22 degrees.

From Table 2 it is seen that the capacity of the two compressors is greater than 9500 Btu. per hour whenever the suction pressure is greater than 6 inch vacuum.

A 23 degree temperature difference should be obtained in a zero room when the suction pressure is 2 psig., under which conditions the capacity of the compressors is 15,600 Btu. per hour. This should enable the two compressors to maintain a zero temperature in the room when operating about 37 minutes out of every hour.

Conclusions: From the above observations, I conclude that you are not getting out of your coils any where near the capacity that they are capable of delivering.

Causes for Insufficient Coil Capacity:

(1) The principal cause for insufficient coil capacity is lack of ammonia in the coil. If the expansion valve is not supplying enough ammonia to the coil to maintain a wetted surface throughout its entire length it is starving the coil. Perhaps there is not enough ammonia in the system, or perhaps the expansion valve is not open wide enough.

(2) A second cause for insufficient coil capacity is the presence of oil in the coil.

(3) A third cause for insufficient coil capacity is a stoppage or partial stoppage of the gas flow. This may be due to too high a pressure setting of a back pressure valve at the exit of the coil, or to scale accumulation at an elbow or bend.

(4) A fourth cause for insufficient coil capacity is the accumulation of heavy frost around and between the coils. This is likely to occur if the coils are spaced on 4½ inch centers or less, and have not been defrosted frequently.

Remedy: Look for the cause or causes of the coil capacity shortage and correct them. If none of those outlined above do the trick, I believe that I would question seriously whether I had good anhydrous ammonia in the system. You might also check your gauges for accuracy, although this would not reduce your running time.—H.G.V.

Agitator Aerates Brine

Question No. 822: We have a vertical propellor type brine circulator or agitator in our brine cooling tank. On the discharge side of the brine stream there is a considerable release of air bubbles. Apparently the agitator is pulling air into the brine which I have been told will make it more corrosive. Is this true and how can I prevent this treatment of air in the brine?—C.P.N.

ANSWER: An inspection of the brine trough around the propellor will disclose whether or not a vortex or whirlpool exists causing air to be sucked into the brine stream. There are three major causes of this vortex, viz. (1) insufficient submergence of the propellor, (2) inadequate agitator trough, and (3) too large propellor capacity.

The propellor might be lowered, or it may be possible to break up the whirl pool by lowering a cross-shaped baffle into the center of it. Check the agitator trough and see if it is not possible to increase its dimensions so that the brine will flow to the propellor more freely. If the first two suggestions are impracticable, you should contact the manufacturer and let him suggest a propellor of smaller capacity.

A small amount of air is always present in brine, but this excessive amount makes it compulsory that you treat it against rapid corrosion. Much has been written on brine treatments for both calcium and sodium chloride brines. —H.G.V.

New Questions

Candy Cases Sweat

Question No. 823: In an air conditioned department store we have a candy department whose cases are cooled by a unit which keeps the temperature of the candy at 70 F. with approximately 50 per cent relative humidity. It operates perfectly in the day-time when the store is air conditioned. At night when the humidity rises in the store the cases sweat and it ruins all merchandise that is on top of the cases and even wets the floor for several feet out into the aisle. These are single glass cases with a blower inside the case.

I would appreciate any suggestions you can give on this problem. I would also like to know the proper dry bulb temperature and wet bulb temperature to keep the candy in these cases—C.W.S.

Gas Storage

Question No. 824: We are analyzing the matter of adding fruit storage space to our plant. Occasionally I read about cold storage methods which use a certain percentage of carbon dioxide or other gas in the storage room to aid in preserving fruits. Is this gas storage really effective and how is it handled?—L.W.R.

Loose Compressor

Question No. 825: Our 10 x 10 ammonia compressor tore loose from the foundation and broke the foundation bolts. On investigation we have found that the concrete of the foundation is impregnated with oil. What procedure would you recommend for renewing the foundation bolts and regrouting the compressor?—H.T.

1949 Convention Offers Unusual Features

SINCE the 40th annual meeting will be held at Purdue University the convention attendants will enjoy facilities and features not previously equaled at these annual meetings. The University is not only a widely recognized engineering school but also has a very large college of mechanical engineering which is especially well equipped. The operating demonstrations provided in connection with the convention will feature an extremely wide range of equipment. The facilities will be presented and explained on a very practical basis which will prove interesting and useful to convention attendants.

As Professor Venemann said in a conference on the program, the convention attendants will learn that the university people deal with facts. Although it is necessary to be familiar with the basic theory they keep concrete applications in mind and gear their work to the needs of the industry.

For example Professor William Miller will present the subject of air conditioning on the program. He is noted for his ability to present a large amount of useful information on his subject without resort to abstract discussion or complicated theory. It has been pointed out that the unusually high temperatures encountered this season will greatly expand interest in air conditioning for comfort, processing and other fields. The treatment of this subject at the convention will prove very interesting to the refrigerating engineer.

Professor Venemann's reputation in teaching refrigerating engineering is widely known. His paper on this subject will be one of the features of the Purdue Convention.

The Bureau of Refrigeration Information will be organized again this year with its group of experts to handle the numerous questions attendants appear so ready to present.

Purdue Memorial Building, Purdue University

The members of the bureau came to the previous convention with a considerable list of questions submitted by some of the chapters, but many of them were not needed to complete the evening's discussion. The attendants had plenty of questions ready for the bureau and showed great eagerness to present them. The members of the bureau were equally ready to provide the answers and convention attendants are looking forward to this session.

In addition to the numerous papers and demonstrations provided by members of the Purdue staff, specialists from the industry will also provide papers on subjects of great interest. In general these papers will present specific information on how to obtain the best operating results from refrigerating plants in the different fields represented by the membership. The complete program is being prepared for printing and will be distributed well in advance of the convention.

Meanwhile get set to attend this outstanding meeting. You will find it most worthwhile from every standpoint.

40th Annual Meeting
Purdue University
November 8, 9, 10, 11, 1949

N.A.P.R.E. Department

Member Activities

San Francisco

By Hunter Mc Laughlin

THE program for our June 22 meeting was presented by our own member, Emmett Flaherty fo the Golden State Co. Ltd., one of the largest producers of milk and dairy products in this area. Mr. Flaherty has had a great deal of experience in the low pressure rerfigeration servicing field. His talk, entitled "Contaminants in Refrigeration Systems," took up the problems of moisture and leaks and how to combat these difficulties.

The conditions under which moisture is able to enter a system were reviewed and then Mr. Flaherty proceeded to make some practical demonstrations. A small factory-dry cylinder of Freon-12 as well as a cylinder containing a small amount of moisture, were used as a starting point. Then a commercially available type of visual moisture indicator was installed in a common line leading from each cylinder. It was then shown how the indicating device would react in the case of, first the dry cylinder and then the wet cylinder.

Next a commercial dehydrator was installed in the common line and the removal of moisture was observed by the fact that no effect was made on the indicator.

Mr. Flaherty then took up the matter of leaks. He inserted a commercially available stain into the refrigerant line and in conjunction with a glass bulls-eye type indicator, illustrated how leaks around a loose fitting could be easily detected.

A demonstration was also given of the use of halide leak detection appliances employing the heated copper reaction plate principle. Both the compressed gas type and the alcohol type were used. New leak detection methods employing "Black Light" and "Electronic" principles were also discussed. This was a most interesting and worthwhile program. Our members are hoping that we may again take advantage of Mr. Flaherty's practical knowledge in the near future.

Our meeting of July 13 featured our member, Bill Orton in an interesting discussion of the proper ways to install disconnect switches, automatic starters and automatic pilot controls in refrigeration systems. The program started as a formal discussion, but the interest immediately shown by the membership opened the subject up for general discussion from the floor. One memorable point about the program was that the diagrams that had been carefully prepared on the blackboard, were pretty well altered by the time everyone had his full say.

The meeting of July 27 had as its highlight another of our members, Dick Kelahan, who is locally associated with the Cork Insulation Co. Mr. Kelahan had just returned from a trip to his eastern plant and presented us with a highly informative description of just how a modern cork processing factory operates. By means of a large flow diagram the steps of the processes were taken up in detail, from the arrival of the raw cork to the shipment of the various finished products. This was very educational and was a novel presentation because of the use of flow diagrams. We hope to use this method of demonstration often in the future.

We have been advised of the interest expressed by various business firms in different parts of the world in an article that appeared in a recent issue of Ice and Refrigeration, authored by our Bert McKenna, entitled "Refrigeration in the Dairy Plant." Mr. McKenna advises that he has received inquiries from Mexico and Australia. We feel that our chapter is exceptionally honored by this expression of interest in the "know how" of one of its illustrious members.

Memphis

By Charles Conley

The members of the chapter were invited to present their suggestions for the season's educational program at the recent meeting of the chapter. A number of members offered suggestions and these were thoroughly discussed at the meeting. A schedule of subjects was prepared and the new 1949-50 program will start on the first Wednesday of September. The group expressed themselves as looking forward to the beginning of this new program.

Elected to membership at this meeting were James C. DeCourley, chief engineer of the Swift Ice Cream plant and Frank A. Funk, operator of a refrigeration service business. The chapter welcomes these men to membership.

After the business meeting was completed the attendants engaged in discussion of plant operating problems.

Colton

By H. O. Bonter

The June 18 meeting was held at the National Ice and Cold Storage Plant at Riverside, Calif., where a lunch was served and after a brief business meeting E. H. Carlson gave a very interesting class lecture. The main speaker of the evening was A. C. Burns of Hart-Burns, Inc. paint manufacturers. Mr. Burns explained with photos how the navy experimented with the paint on ships to keep the barnacle growth from forming on the bottom of the hulls. The chemicals in the paint which is put on very thick by a hot spray process kill the larva and it is washed off by the water.

The July 13 meeting was an inspection tour through the Exchange Orange Products Co. plant at Ontario, Calif., which is a very large plant employing about 600 workers. Besides being the largest pectin plant in the world they produce great quantities of orange juice and orange oil which is used in making various kinds of orange drinks. The orange juice is put up in one gallon cans to fifty gallon barrels. Pulp, after the by-products have been removed, is dried and made into cow feed.

A quarter million dollar addition to the plant includes a large ammonia compressor, 700 h.p. motor, and a large low temperature evaporator for taking a portion of the water out of the orange juice. The oranges are brought in by trucks from all over Southern California. They are put through the washers and graders and bad ones sorted out before going into the various processes.

William E. Nugent and J. F. Mills, chief engineer and chief lab chemist escorted the group through the plant. It was a very interesting tour.

Tulsa

By Gene Sumner

The annual water melon feast of Tulsa Chapter was held on the grounds of the Tulsa Cold Storage Co., on the evening of August 5. Members and guests and their families enjoyed croquet, horseshoes and other games and entertainment. The climax of the evening was the cutting of an abundant supply of ice cold water melon. Everyone enjoyed himself and this event is established as a feature attraction in the association year .

Of late the chapter has been concentrating on membership building. Recently we have welcomed five new members: Kenneth Addison, Jr., Thomas Henry, W. J. McPherson, J. W. Smith and Edmond Schultz.

In order to provide more news for the monthly letter and the member activities column Bill McPherson, engineer at the Atlas Building has been appointed reporter for the chapter. Members are requested to transmit news concerning members and their activities to Mr. McPherson whose phone number is—2-4598.

President K. G. Wight has just opened a new refrigeration supply house in Muskogee and we wish him the best of luck in this new business venture. Unfortunately the demands of this activity make it necessary for him to resign as president. His fine work in that office has been appreciated by all the members.

The regular meetings of the chapter will be resumed on the second and fourth Fridays of September. The dates are September 9 and 23, and we look forward to having all the members in attendance.

Rio Grande Valley

By Armin Doneis

Instructor John Muller and his assistant Ray Woolrich, Jr. put the members through their paces in groups at the blackboard calculating heat loads for various commodities and equipment in a storage vault and ice-tank. Considerable discussion arose as to how much of a motor's output shows up eventually in the form of heat-energy which needs to be removed by the refrigerant, and the problem is to be laid before Professor Venemann in the NAPRE Question Box for final authoritative settlement.

It was decided by unanimous vote, that the Rio Grande Valley Chapter devote a considerable portion of the chapter's funds to the rental of visual education films and projectors, and to intersperse rented films with others supplied by manufacturers gratis.

The question of improving attendance at meetings brought up the matter of the possible advisability of choosing a meeting night more convenient for the majority of the members. The secretary was instructed to send out questionnaire-cards to inquire the members' preference.

Pittsburgh

By Louis Mantz

The meeting of Pittsburgh Chapter was held in the Fort Pitt Hotel. The program of the evening was arranged by Mr. Brown of the Pittsburgh Gage and Supply Co. It featured the products of Jenkins Bros., manufacturers of valves.

Sound movies were shown to illustrate the design and manufacture of Jenkins Valves and depict some of their applications in industry. An improved type of valve which is designated as an armor seat valve was presented to the meeting by L. V. McCune, representative of Jenkins Bros. He had samples of the valve on display and described how its construction contributed to long, trouble-free service. The sales manager of the Pittsburgh Gage and Supply Co., Mr. Simpson, thanked the chapter for the opportunity to present the program of the evening. At the conclusion the members enjoyed excellent refershments served through the courtesy of Jenkins Bros.

Los Angeles

By Fred Herr

Following two months of summer vacation during which no meetings were held, Los Angeles Chapter of the NAPRE had two major events scheduled for September.

Chapter activity is to be resumed on the night of September 7 when the annual Ham-&-Beans Dinner will be held in Pacific Fruit Express cantina in pursuance to a custom of many years which called for the first Fall session to take the form of a gustatory delight, free of speeches, reports and reading of minutes.

Between 150 and 200 members and guests were expected to converge on the PFE establishment on the banks of the Los Angeles River to partake of the savory Virginia ham and beans, prepared by PFE chefs and served by a PFE waiters crew composed of Emmet Quinn, Merle Brick, M. A. Cardoza, David R. Davidson, Howard Gilmore, George Goodell, and such others of the PFE contingent that Quinn can catch and tie an apron on.

For entertainment at the Ham-&-Beans feast, Ed L. Nelson has promised a snappy preview of several acts scheduled for appearance at the Chapter's 1949 Jamboree (at the Breakfast Club) in October.

An imposing business program and speakers' schedule has been announced by President Rudie Kettler for the September 21 meeting. In addition to a recapitulation of activity of the membership committee during the summer months, a special event will be the appearance of Arthur Hess, general chairman of the Blair Foundation Movement, who will outline the hopes of that group for financing the establishment of a refrigeration laboratory and training class at the Frank Wiggins Trade School, Los Angeles, with funds the committee hopes to obtain from generous members of the industry as a whole.

New Orleans

By Frank Gillio

The members of the chapter were treated to an outstanding educational program on Carrier centrifugal refrigeration at our meeting of Wednesday, July 13, Roosevelt Hotel. One hundred twenty five members and guests were present. This was one of the largest outpouring of members in a long time.

Representing the Carrier Corporation were J. D. Bynum, construction manager of the Dallas office, C. D. Terrell of the Houston office and J. D. Manning, construction superintendent who made a special trip from the Carrier factory at Syracuse, N. Y. to be present.

Mr. Bynum conducted the meeting and was assisted by Messrs. Terrell and Manning. A motion picture showing the beginning of the air conditioning industry by Dr. Willis Carrier began the program. After the film, Mr. Bynum explained in detail with the aid of slides, the various parts of a Carrier centrifugal compressor and the operation and maintenance of same. Messrs. Terrell and Manning then spoke and they imparted much additional information to the attendants. Numerous questions were asked and ably answered by the speakers. Great appreciation was expressed to them by the officers and by chapter vote.

S. C. Ford, Director of Fire Prevention for the New Orleans Fire Department was accepted as a member and was given the oath of membership by Treasurer Whitman.

F. A. Thomas, District Sales Representative for the Leslie Controls was the featured speaker at the next meeting on Wednesday, July 27.

Mr. Thomas' subject covered Leslie Controls as applied to steam equipment, and the members and guests in attendance were deeply impressed with the manner in which it was presented. Much additional knowledge as to the proper operation of these valves was obtained. At the conclusion Mr. Thomas was given a rising vote of thanks.

Finals Near in Membership Race

WITH six weeks to go in the membership race it is expected that the usual tightening up will occur. Some of it has already. New Orleans Chapter concluded its special work on the Operating Data Book and launched a drive on membership. By mid August they had joined Los Angeles and Marion in the Senior Class. It represented some fast work on their part. Meanwhile Los Angeles kept pushing and piled up more points. Possibly a new class will have to be set up to accommodate them.

The Junior Class continues to be represented by Detroit and St. Louis. Three chapters announced with pride that they are no longer freshmen. These are: Memphis, San Francisco and Fresno, who have boosted the Sophomore Class enrollment to a total of six.

During September a number of chapters will reach the end of their summer recess and then will resume meetings. Probably the others will also speed up their activity in a manner to alter the present lineup which follows:

SENIOR

Los Angeles	New Orleans	Marion

JUNIOR

Detroit	St. Louis

SOPHOMORE

Minnesota	San Jose	Chicago
San Francisco	Memphis	Fresno

FRESHMEN

Pittsburgh	Dallas	Portland
Stockton-Modesto	Sacramento	Seattle
Rio Grande Valley	Yakima	Colton

1949 Operating Data Book Published

EARLY in August the 1949 edition of the Operating Data Book was published. The contents of the book includes technical papers from the 39th annual meeting. A number of these have not previously been published. The book will answer the needs of the members who have inquired about the availability of these papers for reference and guidance in their work.

Almost 50 questions and answers are included in the 1949 Question Box which covers an extensive section in the current book. The subject matter with which they deal embraces a wide field in refrigerating engineering. For this reason the members will not only find much direct use material in this section but will also utilize it as a guide to follow in solving problems involving different quantities or basic data.

The extensive advertising section provides information on a wide range of equipment and services used in the refrigerating industry. Some new equipment is described along with much that has been widely used in the industry. The trade section of the book will give the members a broad selection of sources of supply which they can use in the maintenance and construction season which will begin shortly.

Distribution of the books was made through the chapters to chapter members. Members-at-Large received their books direct from the national office.

ENGINE ROOM POINTERS –

Higher Steam Pressures

AN interesting paper on higher steam pressures was read some time ago at a meeting of the American Society of Mechanical Engineers. In discussing the paper a prominent consulting mechanical engineer stated that in one plant a 5,000 kw. turbine-generator took steam at 250 lb. per sq. in. pressure and exhausted it at 80 lb. per sq. in., the exhaust being used in a process system. In that way the unit delivered power for less than one-half of one cent per kw-hour, taking into consideration all charges—overhead, maintenance, depreciation, interest, etc. Another prominent engineer stated that in industrial plants the "highest practicable steam pressure and temperature should always be considered."

Because of the fact that but comparatively few refrigerating plants are operating at high pressure and temperature at the present time there are no "standards" as yet, but they will naturally follow in time. Enough is already known about high pressure and high temperature operation so that engineers can closely predict the economies that will result. These things are no longer an entirely unknown quantity and in many respects we are pretty well through the experimental stage. Of one thing we can be sure, to wit: refrigerating plants will always continue to be improved, year after year, without end.—F. S. W.

What Is a Damper Regulator For?

WE ARE so accustomed to damper regulators—even on stoves and furnaces in our homes—that we don't bother to give them much thought. At least, this writer was pretty well along in years before he asked himself, "What is a damper regulator really for?"

Briefly, as the writer now sees it, the function of a damper regulator on the steam boiler furnace, is principally to diminish or increase the total flow of properly proportioned air. The most logical place for this is in the breeching or uptake—not at the entrance to the fuel bed. Besides, if placed at the entrance it could hardly be called a "damper" regulator.

Also, if placed at the entrance to the fuel bed it would be necessary to proportion both the primary and secondary air simultaneously which could be a rather difficult thing for a single instrument to do. It is much simpler to control the gases all in one duct after they are combined.

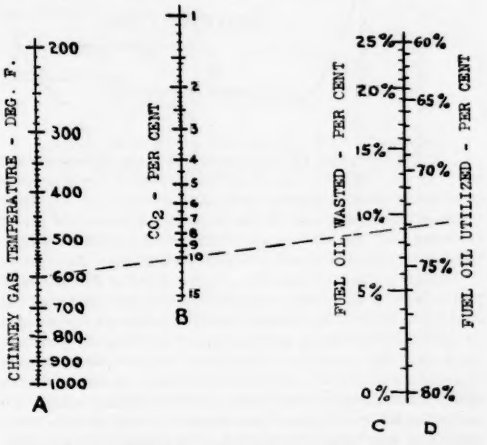
The function of a chimney, where forced or induced draft fans are not used, is to supply by natural suction enough air for complete combustion, and at the same time, it must carry away the burned gases. A chimney is, or should be, so proportioned as to be capable of giving sufficient draft to cause the boiler to develop considerably more than its rated power in case of emergencies. This means that for a normal boiler load most chimneys are from 50 to 100 per cent oversize, and even more. Hence, unless automatic means are employed to reduce or properly proportion the pulling power of the chimney by operating a damper, from 50 to 100 per cent more air must be fed to the fire than is required. The result is, of course, that the excess air becomes a burden to the furnace, and must be heated up to the temperture of the furnace. Then it is emptied into the atmosphere at a high temperature, cusing a considerable loss of fuel. Or, so much excess air is drawn into the furnace that the furnace temperature in certain parts is cooled below the temperature of ignition, resulting in the escape of unburned gases up the chimney. This loss may be even greater than the first loss mentioned in this paragraph.

Damper regulators therefore play a prominent part in boiler operation. A good damper regulator, costing hundreds of dollars, will usually save its own cost several times in its first year of use. So, next time you install a damper regulator make sure it is a good one. And if, perchance, your present damper regulators could be improved, it might be worth while to give more thought to this subject. It is well known that chimneys are wasteful. In many instances much of that waste can be very much reduced.—F.S.W.

How Much Fuel Oil Do You Waste? How Much Do You Utilize?

THIS chart will answer the above questions for you if you will simply run a single straight line across the columns as indicated by the dotted line.

For example, if you chimney gas temperature is 600 deg. F., column A, and your CO_2 is 10 per cent, column B, the dotted line instantly tells you that you are wasting 9% of your oil, column C, and you are utilizing a little over 73% of the oil's heat value, column D.

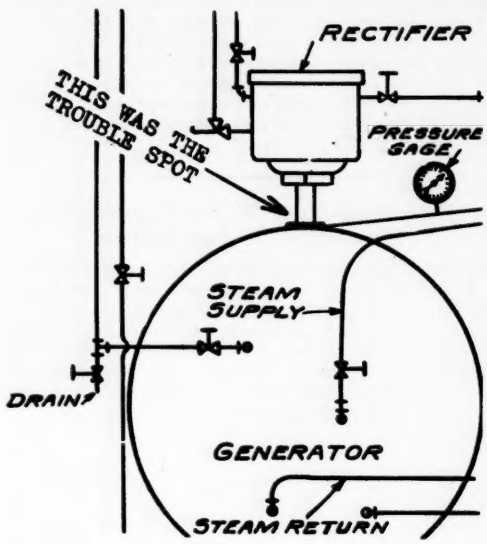


The chart is based on the attainable efficiency of 80 per cent. That is, it is assumed that if you are utilizing 80 per cent of the fuel oil you are doing about as well as can be expected and the chart, column C shows that you are not wasting anything. Thus if you are utilizing only 60% of the fuel oil, column D, you are wasting 25% of the fuel, column C.

A study of the chart makes it clear that high CO_2 is important and so is low chimney gas temperature. For instance if you can attain a chimney gas temperature of 400 deg. F. and at the same time have 15% CO_2 you will utilize more than 80 per cent of the heat in the oil. Although that is beyond the limit of this chart it "can be done" and it is commendable operation.—W.F.S.

Dab of Paste Worth About 5 Cents Saved Over $100

HERE is an instance where, in this writer's experience, about 5 cents worth of paste saved over $100 for a refrigerating company. Occurrences of this nature are not at all uncommon, yet we are inclined to forget about, or ignore, the tremendous earning power of pastes, paints, dressings, and "stitches in time," and the like. The writer was connected with the above manufacturer for nearly four years. We manufactured and installed an absorption ice making and refrigeration system.



In the operation of the system ammonia pressure went up to about 175 lb. per sq. in. and inasmuch as the generator was under that pressure part of the time and under a vacuum during the rest of the time, being hot while under pressure and cool while under vacuum, it is evident that to keep joints tight was not a simple matter with this system of refrigeration. On account of joint trouble it was found that riveted constructions would soon leak and that welding of the longitudinal and circumferential joints was necessary. In fact that company pioneered the welding of pressure vessels of that type and, to be sure, we had much trouble as pioneers usually do. In one installation an operator was killed when the generator seam suddenly parted and in the explosion which followed the sheet of metal of which the generator was built was flattened out against a brick wall. In the sketch herewith, a generator is partially shown.

At "this" end of the generator was a pot shaped "rectifier," also shown in the sketch. This rectifier was joined to the generator by means of a nipple, also visible in the sketch. This nipple, like all other nipples and pipes, was welded to the generator for the sake of tightness. The top of the nipple was threaded to receive the rectifier.

Much trouble was experienced with one of the installations because of leakage of ammonia gas through the threads between the rectifier and the nipple. Whenever ammonia leaks everybody in the vicinity soon knows it, particularly when the leak is as "bad" as in this instance. There was much complaining by neighbors and others because of this leakage. In fact the city council in this particular instance was on the point of declaring the plant a nuisance and forbidding its further operation.

Attempts were feverishly made to tighten the rectifier sufficiently with a wrench to stop leakage, but leakage when under pressure persisted.

For a while it was thought that it would be necessary to weld a new nipple into the generator because of the faulty threads on the nipple being used. We were certain that the threads were faulty because other similar installations gave no trouble. This writer figured that the cost of welding a new nipple onto the generator would be well over $100 because expert welders would have to be sent there by the manufacturers of the generator. All of the ammonia would have to be removed from the generator and as the amount of ammonia was considerable and the ammonia drums had already been returned to the manufacturers, it would be expensive to obtain them, empty the generator, weld in the new nipple, refill the generator, and then return the drums to the ammonia concern.

Besides, insulation would have to be removed from the generator and possibly the generator would have to be rolled over so that the welders could get at it. This would necessitate disconnecting all of the piping shown in the sketch plus more piping that is not shown and would be equivalent to doing the job of installing all over again. The old nipple, of course, would have to be cut out. Besides, the cost of the delay would amount to a great deal—perhaps more than the above cost to the manufacturer. So it is safe to say that the cost of welding would have been well over $100.

As already stated, about 5 cents worth of paste and a few minute's time solved the problem nicely. The erecting superintendent whose pet application was a combination of glycerine and litharge and who had used that combination throughout this job was finally prevailed upon by one of the mechanics to try a standard manufactured paste. The rectifier was taken off, the paste was applied, the rectifier was screwed on, and since that time, up to the last time this writer heard of it, the joint has been as tight as the welded joint between the nipple and the generator—S.F.W.

What is the Cost of Electric Motor Burnouts?

SEVERAL years ago this writer endeavored to learn from various sources the cost of electric motor burnouts, but he was unsuccessful in his efforts. There seemed to be no definite information on the subject.

Then not long thereafter some figures came into the writer's possession concerning a factory in which nearly 5000 electric motors are operated—the total power consumption being slightly over 40,000 hp. To be exact, the average of each motor was figured as being 8.90 hp.

The statement showed that in this plant they averaged over 100 burn-outs every year. The total cost of re-winding the motors was given. Applying his slide rule the writer found that the amount was $83.80 for each motor burned out. Nothing was said about the other costs such as the cost of holding up production, cost of idle labor during breakdown period, etc.

Costs at present are doubtless higher owing to the current higher cost of labor. But nevertheless the above information will very likely be found valuable and interesting to many readers and may be welcomed by all users of electric motors. Possibly some readers have further facts regarding the cost of motor burn-outs to add to our fund of present knowledge and if so the writer will be glad to see such figures and so, without doubt, will many other readers.

Frozen Foods

Reg. U. S. Patent Office

COVERING EVERY PHASE OF THE QUICK FREEZING OF PERISHABLE FOODS—PREPARATION, PACKAGING, FREEZING, STORAGE, DISTRIBUTION, DESIGN, CONSTRUCTION, EQUIPMENT, OPERATION OF LOCKER PLANTS.

Frozen Food Locker Institute

THE exposition and program of the Frozen Food Locker Institute will be held at the Sherman Hotel, Chicago, October 3-5, 1949. Preliminary announcement of this program is being well received by locker operators in all parts of the United States. Many of them have accepted the Institute's invitation to serve on the operator's advisory committee.

A considerable part of the exhibit space has already been reserved and it is expected that the exposition will be as large or larger than last year. The program opens Monday, October 3 with selection of a beauty queen, "Miss Frozen Food Locker of 1949," a talk by John L. Hoppe, publisher of Locker Management, on "Why 612,000 Families Rented Lockers in Twelve Months"; and a play, "Mr. Smith Modernizes His Locker Plant."

Tuesday will be used for conferences on slaughtering and meat cutting and business sessions, reports of officers and committee chairmen, and election of officers.

On Wednesday, conferences will be held again on packaging, wrapping and marking; and smoking, curing and sausage making. The FFLI advertising and merchandising program will be presented by H. A. Hohman, president Beaumont & Hohman, assisted by prominent locker operators.

A complete program of entertainment for the ladies including sight seeing, tours, style shows, luncheons, theater parties, radio and television broadcasts is being planned. A hospitality desk will be set up at the hotel for information and assistance of delegates and visitors.

Processing Increases Co-op Locker Business

COMBINING preparation of products for storage service has been one of the most important factors contributing to the rapid growth of cooperative frozen food locker plants, according to a new U. S. Department of Agriculture report, "Processing by Frozen Food Locker Cooperatives." This publication has just been issued by Farm Credit Administration's Cooperative Research and Service Division as Miscellaneous Report 129.

The study, made by L. B. Mann, R. L. Fox, and P. C. Wilkins, with Research and Marketing Act funds, covers 70 cooperatives operating 65 slaughter and 112 locker plants located in nine Midwestern, Southwestern, and Southeastern States. It gives specific information on the type and size of plants studied, equipment, volume, rates charged, techniques used, utilization of byproducts, and operating results.

The authors point out that while locker cooperatives operate in a field of relatively narrow margins, they have an excellent chance to improve quality, upgrade diets of both farm and urban patrons, expand outlets for locally produced food, and narrow the spread between producers and consumers.

Investment in all facilities and equipment averaged $66,288 per plant, or $75 per locker. Extreme ranges were from $32 to $168 per locker. In general, plants offering the most complete service such as slaughtering, chilling, aging, cutting, wrapping, freezing, curing, smoking, lard rendering, and poultry dressing had the largest investment in facilities.

Rates for slaughtering cattle averaged $4.24 per head and ranged from $2.39 to $7.37. Average charge for slaughtering hogs was $2.46 per head and ranged from $2 in the Midwest to $3.30 in Southern and Eastern States. Rates for cutting, freezing, and grinding averaged $2.69 per hundred pounds and ranged from $2.07 to $3.78. Locker rental rates ranged from $10.73 to $14.91 per locker and averaged $13.19.

Gross annual receipts per locker rented averaged $38.38; expenses before income tax and interest, $34.35; and net savings, $4.03.

Loose Stacking Required for Storage of Frozen Fruits and Vegetables

IN a recent bulletin of the Refrigeration Research Foundation, attention was called to the necessity of loose stacking at the receiving end of frozen fruits and vegetables. Solid stacking at the production end is appropriate, providing freezing has been adequate, but after transportation from west to east, it is rarely true that goods arrive at a temperature substantially lower than 10 F., therefore loose stacking is necessary, the bulletin states, unless the storer specifies otherwise. The question of adequately lower product temperature for frozen foods in storage has great industrial importance. Temperatures that were not adequate have caused certain known losses and undoubtedly a great deal of unknown loss from lowering of quality.

One Stop Regulation Cancelled

THE "one-stop" regulation on frozen food cars was cancelled by eastern railroads effective June 20. This means that frozen food cars may now make one stop enroute for partial unloading even though they have already had one stop for complete loading.

Another change affecting the transportation of frozen food effective July 1 is an increase in the minimum weight on refrigerator cars of 2200 cu. ft. or larger, which has been increased from 46,000 to 55,000 lbs.

Carrier Acquires New Fruit Juice Concentrator

PLANS have been announced by Carrier Corp., Syracuse, N. Y., to expand its operations through the acquisition of control of C. E. Howard & Co., Southgate, Calif., for the developers of the Kelley-Howard method of concentrating citrus juices for freezing and other purposes. The new company will be known as the C. E. Howard Corp.

The new concentrator, according to Carrier, which retains vitamins and flavor by inducing evaporation in a high vacuum, without employing heat, also can be used in concentrating a number of liquids other than citrus juices. Extensive marketing plans are now being developed, and the process will be made available not only on the Pacific Coast but throughout the United States it is stated.

This first installation was made for Real Gold Citrus Products, the processing division of Mutual Orange Distributors at Anaheim, California, and is producing orange juice concentrates. E. J. Kelly, designer of the concentrator, who will be chief engineer of the new corporation, said:

"The new concentrator provides substantial reductions in owning and operating costs due to several unique design features. Utilizing high vacuum technique in conjunction with a conventional refrigeration cycle, the material being concentrated in a continuous process provides its own heat for the evaporation of vapor. The refrigeration equipment is used merely to transfer heat. As applied to citrus juice concentration, as well as to other concentration processes, the temperature of the material being concentrated is never above that at which it enters the process, the final temperature in case of citrus juice being 50 F. This is of the utmost importance in the retention of vitamin and flavor constituents. However, the flexibility of the concentrator is such that it may be applied to concentration or evaporation processes requiring substantially higher temperatures or extremely low temperatures.

"The safety features of the new concentrator are particularly interesting. Low pressure equipment is used throughout. Live steam can be applied for both sterilization and cleanup. Primary power for the concentrator may be electricity, steam or Diesel. Thus it is suitable for practically all plant requirements."

E. T. Murphy, senior vice-president of Carrier Corporation, who is now in Los Angeles in connection with the organization of C. E. Howard Corp., stated: "Our aim is to develop aggressively this concentrator business, not only with respect to the citrus fruit industry but many others. We believe that the equipment will prove useful in numerous fields, and particularly in the milk, chemical and pharmaceutical industries."

Southwest Air Conditioning Exposition

A WELL-ROUNDED group of exhibits is assured for the Southwest Air Conditioning Exposition, which is to be held at Fair Park, Dallas, Texas, January 23 to 27, 1950.

This exhibit is held in conjunction with the dates of the 56th annual meeting of the American Society of Heating and Ventilating Engineers, which sponsors the exposition. The meetings of the society will attract a large gathering of engineers in every branch of the profession, which includes heating, piping, ventilating, cooling, filtration and purification of air for industries, business, institutions and dwelling places.

Controlled Refrigeration

(Continued from page 19)

Storage Room Temperature Control

Most products made in the processing room just described must be stored under refrigeration. The control system for the storage room is quite similar to that used for the processing room with exception that the *ElectroniK* resistance thermometer controller (shown on panel board at left) is calibrated from minus 10 to plus 10 C.

For products where processing temperatures are not quite so critical the super centrifuges and other vessels are individually refrigerated. One installation of this type is illustrated. Note in the background the strip chart *ElectroniK* potentiometer, calibrated from minus 20 to plus 70 C and equipped with a mercury switch for controlling (on-off) a solenoid valve in the refrigerant line.

In summary, it can be concluded that, were it not for reliable and accurate temperature controls, biological processes for producing materials such as blood proteins for the benefaction of mankind would not be possible.

Increased Rail Rates Will Divert Frozen Foods to Truck Haulage

ACTION of the Interstate Commerce Commission, Washington, D. C., in authorizing an additional 3.7 per cent average increase in rail freight rates effective September 1 is likely to provide new impetus for the expansion of long-haul refrigerated truck routes for carrying frozen foods.

The new rail tariffs mean freight rates on the average are now 9.1 per cent higher than a year ago. The I.C.C. okayed a freight rate boost of about 5.2 per cent early this year, and has now authorized an extra 3.7 per cent. The exact increases vary slightly in different territories. But they mean that rail transport of frozen products is more costly, and will turn food processors' and distributors' attention to highway transport.

The I.C.C. itself has acknowledged that a further shift to refrigerated truck haulage for quick-frozen commodities may be in prospect. In a lengthy supporting document released with announcement of the latest freight rate boost, the Commission said:

"Prior to the general increases in rail rates effective in 1948, frozen food moved almost entirely by rail. Since that time, much of the short-haul traffic has been diverted to motor trucks, both common and contract carrier trucks, at rates—including refrigeration—which are less than the rail rates exclusive of refrigeration."

An official on the I.C.C. staff said following the latest increase, "It seems quite logical to me that frozen food processors and distributors will seek to cut their transportation costs by making increasing use of refrigerated trucks. The use of these vehicles has increased markedly the past few years, and post-war developments in truck refrigeration technique suggest they will become even more highly competitive with rail refrigeration."

Frozen food products as described in the railroads' consolidated classification, "comprise cold pack fresh fruit (frozen fresh fruit either sweetened or not sweetened), cold pack fresh or green vegetables (frozen fresh or green vegetables either sweetened or not sweetened), frozen citrus fruit juice, frozen artificial or natural fruit juice, frozen vegetable juice, and cooked, cured or preserved frozen food. More than 50 per cent of these products originates in Pacific Coast territory. They move by rail in refrigerator cars under refrigeration. Actual loading ranges in excess of 60,000 pounds per car. The products compete with corresponding fresh and canned products."

Psychrometric Tables and Data to be Clarified by Committee

AN important step toward international agreement on standard thermodynamic properties of moist air in the range of pressures and temperatures of interest to the aerodynamic, the air conditioning, and the chemical engineer, and to the meteorologist, was taken on May 12, 1949, by members of the International Joint Committee on Psychrometric Data who met under the chairmanship of Dr. Baldwin M. Woods, past president of ASHVE and director of University Extension, University of California, Berkeley.

Meeting in the Towne Scientific School, University of Pennsylvania, Philadelphia, the Joint Committee voted unanimously to accept the final report of its working subcommittee. In effect this report recommends a formulation of the thermodynamic properties of moist air which is claimed to be valid over a considerable range of pressure and temperature and to be thermodynamically consistent within the accuracy of existing data. Essential ingredients of the formulation are represented in the form of skeleton tables with recommended tolerances. Recommendations regarding best values of the relevant physical constants and conversion factors are made; dry air is defined in terms of a fixed, mol-fraction composition.

The Joint Committee also considered some questions of terminology. In particular, it voted to recommend that the term specific humidity be discarded and the term humidity mixing ratio used instead to designate the weight of water vapor per unit weight of dry air, with the understanding that the latter may be contracted to mixing ratio when no ambiguity is introduced thereby.

Re-definition of Relative Humidity

Regarding relative humidity, the Joint Committee was inclined to favor the re-definition recently adopted by the International Meteorological Organization (IMO), namely, the ratio of the given humidity mixing ratio to the humidity mixing ratio at saturation with respect to liquid at the given temperature and pressure. The Joint Committee was fully aware of the fact that at any given temperature there is a lowest pressure and at any given pressure a highest temperature for saturation with respect to liquid so that, according to the IMO redefinition, relative humidity is not defined at or outside the boundary of this region. The Joint Committee was inclined to feel that this restriction is a valid one and that no practical advantage is to be gained by attempting to remove it. The Joint Committee invites comments and suggestions on this important question for study pending the formulation of a definite recommendation.

The final report of the working subcommittee also outlines the overall problem before the Joint Committee as consisting of three main parts: (1) to obtain information regarding the thermodynamic properties of moist air which can claim general acceptance as standard on the ground that it is thermodynamically consistent within the accuracy of existing knowledge; (2) to develop specifications of standard instruments for the practical realization of these properties in the field; (3) to recommend standard symbols, terminology, and charts calculated to promote a better understanding of underlying theory in its application to practical problems involving moist air.

Dr. Woods was made temporary chairman of the International Joint Committee on Psychrometric Data to succeed the late J. H. Walker. The working subcommittee is composed of: Dean John A. Goff (chairman), Towne Scientific School, University of Pennsylvania; C. S. Cragoe, National Bureau of Standards; L. P. Harrison, U. S. Weather Bureau; F. G. Keyes, Massachusetts Institute of Technology. Prof. S. Gratch, Towne Scientific School, University of Pennsylvania, served the subcommittee as technical adviser.

Members of the Joint Committee who attended the May 12 meeting are as follows: B. A. Dmitrieff, The American Society of Mechanical Engineers; John A. Goff, American Society of Heating and Ventilating Engineers; L. P. Harrison, U. S. Weather Bureau; S. G. Rison, British Commonwealth Scientific Office; J. L. York, American Institute of Chemical Engineers, and Dr. Woods. By invitation the following were also present: S. Gratch, Towne Scientific School, University of Pennsylvania; C. S. Leopold, consulting engineer, Philadelphia.

Blair Foundation Project Assured

By Fred A. Herr

THE movement to establish a Jesse C. Blair Foundation to finance the establishment of a modernly equipped refrigeration research laboratory and training class at Los Angeles, Calif., progressed during the summer months from the discussion stage to a point where an actual working plan for instrumenting the proposal has been worked out, with the first gun to be fired at the September 21 meeting of Los Angeles Chapter, National Association Practical Refrigerating Engineers.

So enthusiastically has the plan for a Blair Foundation, which was proposed in June by Arthur Hess, Los Angeles refrigeration and air conditioning engineer, been received by the West Coast industry, that in mid-August seven of the major refrigeration societies active on the Pacific Coast had accorded the movement their approval and support.

In addition to local Southern California chapters of refrigeration societies, two state groups, the California State ASRE and RSES, have joined the effort to raise an endowment fund sufficient to establish and equip a laboratory for refrigeration research and a modern refrigeration training classroom at the Frank Wiggins Trade & Technical School in Los Angeles.

Preliminary steps of how the project was conceived by Mr. Hess as a tribute to the late Jesse C. Blair, refrigeration instructor for the Los Angeles Board of Education, and the initial activity to further the movement which was engaged in by local chapters of the NAPRE, ASRE and RSES, were described in a report in the August, 1949, issue of Ice and Refrigeration.

Since that time five other refrigeration groups have approved the project and assigned membership personnel to assist its development. These includes Colton, Calif., Chapter of the NAPRE; Los Angeles Chapter, American Society of Heating & Ventilating Engineers; Refrigeration Manufacturers Association of Southern California; Western Refrigeration Wholesalers Association; and refrigeration labor organizations.

In July a financial committee of 15 was appointed, composed of members of the different refrigeration organizations, and headed as chairman by Harold McQuay, president of the California RSES.

The committee was delegated with authority to devise a practical plan for raising the initial fund required to build and equip a research laboratory, for re-equipping with more modern and more diversified machinery the present refrigeration class at Frank Wiggins School, and also for drafting a practical plan for assuring the financing of the combined ventures and providing classroom equipment beyond the initial effort. The quick response and cooperation already given to the project fully guarantee its success.

Chicago Committee Arranges for ASRE Annual Meeting

CHAIRMEN of several of the committees appointed by the Chicago section of the American Society of Refrigerating Engineers to plan for the ASRE's national annual meeting to be held at the Edgewater Beach, Chicago, December 5 to 7, 1949, conferred July 14 on preliminary arrangements for the big affair.

Photo by Irving Alter

Committee chairmen appointed by Chicago section of ASRE make plans for the society's meeting to be held next December at the Edgewater Beach.

Expected to be one of the biggest conventions ever held by the Society, the three day gathering will be crammed with technical sessions, entertainment features, committee meetings, and inspection trips. Objective of the Chicago section arrangements committee is to uphold the city's worldwide reputation as a hospitable and efficient convention host. As a center of industry and commerce, employing refrigeration and air conditioning for hundreds of services. Chicago is a particularly appropriate setting for the ASRE's national meeting.

Shown in the accompanying photo are, from left to right, K. E. Wolcott, treasurer of the Chicago section; J. E. Salmon, secretary of the committee; Leon Buehler, Jr., Chicago section chairman; Fred P. Neff, general chairman of the committee; H. J. Prebensen, chairman of the reception committee; Carl Eichstaedt, entertainment committee chairman; and Clarence Sieben, chairman of the banquet committee. Other committee chairmen include W. S. Bodinus, miscellaneous arrangements; D. E. Perham, meetings; J. P. McShane, budget; and C. M. Burnam, Jr., public relations. Mrs. J. P. McShane heads a committee planning activities for the ladies, and Burgess H. Jennings, national president of the ASRE and a member of the Chicago section, is honorary chairman of the general committee.

Government Egg Program

(Continued from page 31)

One factor works to alleviate the situation. The egg production pattern has been changing to bring larger output in the winter months. Thus consumers may find the egg situation a little better this fall than it was in 1947. If not, they will again be stuck with high prices and the egg market will be contracted by refusal of consumers to pay the inflated price.

One-Trip Paper Ice Bags Help to Meet Automatic Ice Machine Competition

A CONTRIBUTION to the ice industry's problem of how to meet the competition of automatic ice making equipment is being offered by a paper bag manufacturer through advertising in ice industry and restaurant publications.

One of the big problems of the ice industry, these advertisements point out is that of distributing clean, uncontaminated processed ice. Sanitation is a primary consideration to restaurant men and that is one reason why some restaurants have invested in expensive ice making equipment rather than take a chance on unprotected ice.

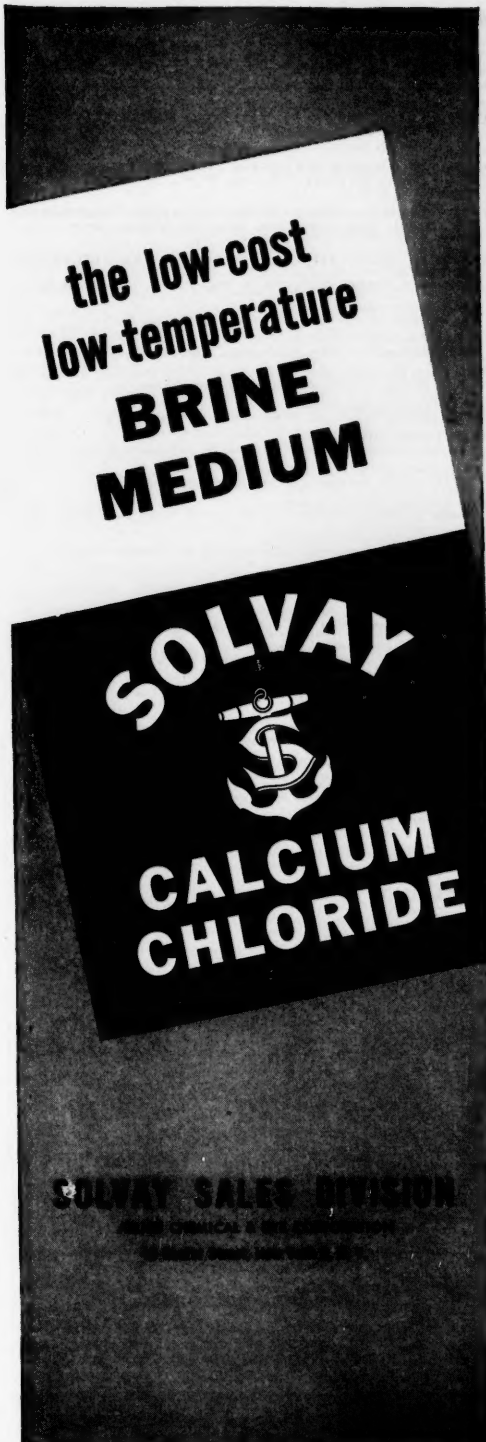
"On sanitation we take no chances—we insist on Packaged Processed Ice"
SAYS LOUIS G. PALMER, OWNER, YE OLDE WAYNE CLUB, DETROIT, MICH.
The One-Trip Paper Ice Bag Solves Your Icing Problems Forever!
BEFORE you spend needed capital for costly space-wasting ice processing equipment, ask your ice company to deliver your ice in one-trip paper ice bags! Union one-trip paper ice bags save you time in icing and are handy to store. Most important, the wire-tied bag tops lock out contamination and prevent spillage, assure you full measure of clean, sanitary ice.
The sturdy wet-strength Kraft paper—two layers thick—actually insulates the ice and so retards melting.
Try out processed ice in Union one-trip ice bags this very week. Stop time-wasting handling of old-fashioned, must-be-returned containers. Avoid the high cost of ice-processing equipment. Switch to Union one-trip paper ice bags and solve your processed ice problems for all time. Ask your ice-man for details.
Wet-Strength Paper Ice Bags have tremendous strength even when soaking wet ... thanks to a water repellent resin that binds the fibers of the paper firmly together.
ONE TRIP
UNION Paper Ice Bags
A product of the UNION BAG & PAPER CORPORATION • Woolworth Bldg., New York 7, N. Y.
Bags of Kraft, Transparent Films, Waxed Paper, Glassine, Laminates

One of the advertisements in restaurant magazines playing up sanitation values of one-trip paper ice bags.

The answer to the problem, this advertiser states, is to package the ice in water repellant one-trip paper bags. Made from specially strong paper, these bags are sturdy enough to stand up under normal delivery needs and the price is such that they fit into the economic pattern of ice distribution.

Increased Rent for Refrigerator Cars

OWNERS of refrigerator cars rented to railroads will receive increased compensation from the railroads for the use of such cars after August 1. Tariff schedules filed with the Interstate Commerce Commission provide for increases in present rates of 2 and 2½ cents to 3 cents a mile on and after that date. A ballot taken among member roads of the Association of American Railroads showed a majority of the railroads in favor of increasing the mileage payments to the car owners.



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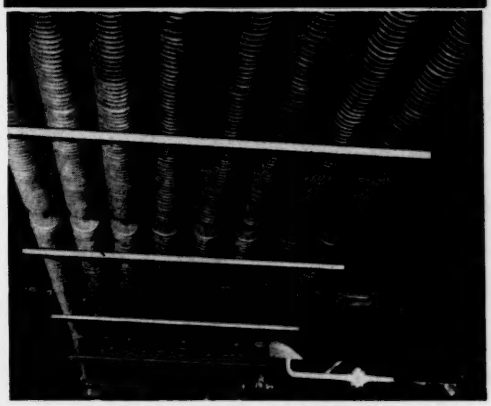

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COMING CONVENTIONS

FROZEN FOOD LOCKER INSTITUTE
October 3-5, 1949
Sherman Hotel, Chicago, Ill.
R. R. FARQUHAR, Exec.-Director

FLORIDA ICE ASSOCIATION
October 13-14, 1949
Soreno Hotel, St. Petersburg, Fla.
Muriel Washbourne, Secretary

NATIONAL ASSOCIATION PRACTICAL REFRIGERATING ENGINEERS
November 8, 9, 10, 11, 1949
Purdue University. Lafayette, Ind.
EMERSON BRANDT, Secretary

ALL INDUSTRY EXPOSITION
November 14-18, 1949
Traymore Hotel, Atlantic City, N. J.
GEO. MILLS, Director

NATIONAL ASSOCIATION OF ICE INDUSTRIES
November 15, 16, 17 and 18, 1949
Hotel Commodore, New York, N. Y.
MOUNT TAYLOR, Secretary

KENTUCKY ICE MANUFACTURERS ASSOCIATION
November 21-22, 1949
Seelbach Hotel, Louisville, Ky.
Russell T. King, Secretary

DELTA STATES ICE ASSOCIATION
November 28-30, 1949
Buena Vista Hotel, Biloxi, Miss.
R. N. MILLING, Secretary

SOUTH CAROLINA ICE MANUFACTURERS ASS'N.
December 5-6, 1949
Poinsett Hotel, Greenville, S. C.
Geo. L. English, Secretary

SOUTHWESTERN ICE MANUFACTURERS' ASSOCIATION
December 7-9, 1949
Plaza Hotel, San Antonio, Tex.
PRESTON A. WEATHERRED, Executive Secretary-Counsel

MISSOURI ICE MANUFACTURERS ASSOCIATION
January 9, 10, 11, 1950
Hotel President, Kansas City, Mo.
V. A. ESPHORST, Secretary-Treasurer

AMERICAN WAREHOUSEMEN'S ASSOCIATION
January 30-February 2, 1950
Edgewater Beach Hotel, Chicago, Ill.
Wilson V. Little, Secretary

NATIONAL ASS'N. REFRIGERATED WAREHOUSES
January 30-February 2, 1950
Edgewater Beach Hotel, Chicago, Ill.
Wm. Dalton, Executive Vice-president

OHIO ASSOCIATION OF ICE INDUSTRIES
February 27-28, 1950
Deshler-Wallick Hotel, Columbus, Ohio
Guy W. Jacobs, Secretary-Treasurer

MICHIGAN ICE INDUSTRIES ASSOCIATION
March 2-3, 1950
Hotel Morton, Grand Rapids, Mich.
W. J. Campbell, Secretary

INDIANA ASSOCIATION OF ICE INDUSTRIES
March 8-9, 1950
Lincoln Hotel, Indianapolis, Ind.
ROBT. W. WALTON, Secretary

ASSOCIATION DIRECTORY

AMERICAN INSTITUTE OF REFRIGERATION
H. T. McDermott, Gen. Secretary, 433 N. Waller, Chicago 44, Ill.

NATIONAL ASSOCIATION OF ICE INDUSTRIES
Mount Taylor, Secretary, 1706 L St., N. W., Washington 6, D. C.

NATIONAL ASSOCIATION OF REFRIGERATED WAREHOUSES
Wm. Dalton, Exec. Vice-Pres., Wm. M. O'Keefe, Secy., Tower Bldg., Washington 5, D. C.

NATIONAL ASSOCIATION OF PRACTICAL REFRIGERATING ENGINEERS
Emerson A. Brandt, Sec'y, 435 N. Waller Ave., Chicago 44, Ill.

CALIFORNIA ASSOCIATION OF ICE INDUSTRIES
L. A. Bailey, Secretary, 461 Market St., San Francisco, Calif.

CANADIAN ASSOCIATION OF ICE INDUSTRIES
K. C. McCrea, Exec.-Secy., 389 Park St., Niag. Falls, Ont., Canada

DELTA STATES ICE ASSOCIATION
R. N. Milling, Secretary, Ouachita Bank Bldg., Monroe, La.

EASTERN STATES ICE ASSOCIATION
Samuel Freer, Secy.-Treas., 12 So. 12th St., Philadelphia, Pa.

FLORIDA ICE ASSOCIATION
Muriel Washburn, Secretary, 1931 Silver St., Jacksonville, Fla.

ILLINOIS ASSOCIATION OF ICE INDUSTRIES
W. D. Wright, Secretary, Clinton Pure Ice Co., Clinton, Ill.

INDIANA ASSOCIATION OF ICE INDUSTRIES
Robert W. Walton, Secretary, Board of Trade Bldg., Indianapolis, Ind.

KANSAS ASSOCIATION OF ICE INDUSTRIES
C. A. Berkihiser, Manhattan Ice & Cold Stg. Co., Manhattan, Kans.

KENTUCKY ICE MANUFACTURERS' ASSOCIATION
R. T. King, Secretary, 429 S. Seventh St., Louisville, Ky.

MICHIGAN ICE INDUSTRIES ASSOCIATION
Wm. J. Campbell, Secretary, Pleasant St. at Campbell, Belding, Mich.

MISSOURI ICE MANUFACTURERS' ASSOCIATION
A. V. Esphorst, Secretary, 3820 Washington St., St. Louis, Mo.

MOUNTAIN STATES ASSOCIATION OF ICE INDUSTRIES
J. R. Espy, Secretary, Espy Ice Co., 2229 - 15th St., Denver, Colo.

NEBRASKA ASSOCIATION OF ICE INDUSTRIES
Frank Vogelsang, Secretary, W. T. Good Ice Co., Lincoln, Nebr.

NEW ENGLAND ICE ASSOCIATION
Raymond Wilber, Secretary, 419 Boyleston St., Boston, Mass.

NEW YORK STATE ASSOCIATION OF REFRIGERATED WAREHOUSES
Chas. G. Ashe, 101 Columbia St., Buffalo 5, N. Y.

NORTH CAROLINA ICE ASSOCIATION
Leslie H. Powell, Secretary, Capital Ice & Coal Co., Raleigh, N. C.

NORTHWEST ASSOCIATION OF ICE INDUSTRIES
D. D. Stewart, Secretary, American Bank Bldg., Seattle, Wash.

OHIO ASSOCIATION OF ICE INDUSTRIES
Guy W. Jacobs, Secretary, The Steubenville Ice Co., Steubenville, Ohio

OKLAHOMA ASSOCIATION OF ICE INDUSTRIES
W. A. Hadley, Secretary, 242 Key Bldg., Oklahoma City, Okla.

PACIFIC STATES COLD STORAGE WAREHOUSEMEN'S ASSOCIATION
L. A. Bailey, Secretary, 461 Market St., San Francisco, Calif.

SOUTH CAROLINA ICE MANUFACTURERS' ASSOCIATION
Geo. L. English, Secretary, P. O. Box 603, Columbia, S. C.

SOUTHERN ICE EXCHANGE
Wilshire Riley, Secy.-Counsel, 421 Rhodes Building, Atlanta, Georgia

SOUTHWESTERN ICE MANUFACTURERS ASSO.
P. A. Weatherred, Secy. Connsel, Mercantile Bank Bldg., Dallas, Texas

TENNESSEE ICE MANUFACTURERS' ASSOCIATION
W. E. Harlan, Secretary, Mt. Pleasant Ice Co., Mt. Pleasant, Tenn.

TRI-STATE ASSOCIATION OF ICE INDUSTRIES
L. R. Girton, Secretary, 260 Boyce-Greeley Bldg., Sioux Falls, S. D.

VIRGINIA ICE MANUFACTURERS' ASSOCIATION
H. H. Snyder, Secretary, Alexandria, Va.

WEST VIRGINIA ASSOCIATION OF ICE INDUSTRIES
E. Dana Smith, Secy., Diamond Ice & Coal Co., Charleston, W. Va.

WISCONSIN ASSOCIATION OF ICE INDUSTRIES
Paul F. Hoff, Secretary, 1300 East Locust St., Milwaukee, Wis.

New Incorporations

Golden Meadow, La.—The Gulf Ice Co. Inc., has filed application for the opening of its ice manufacturing and distributing business. There were 50,000 shares of stock at no par value.

New Orleans, La.—Buras Ice Factory, Inc., ice business, filed articles of incorporation with the office of the secretary of state recently. Authorized capital stock was listed as 2,000 shares of no par value.

Safety Instructions Reduce Accidents

SAFETY in industry is almost exclusively a problem of education, teaching each employee to take advantage of all the safety equipment available and to do his or her job in a safe manner. A machine seldom causes an accident without the cooperation of a human being. This human being must do the thinking for both, and if he is to think safely he must be trained thoroughly in the proper way to do his job.

What is probably the greatest example of education in safety is found in the explosives industry. A fatality rate of 230 per billion pounds of explosives produced during World War I was reduced to 5 per billion pounds produced during World War II. Even more surprising is the fact that the lost-time record was made possible almost entirely because of two factors: First, every employee, and there were many thousands of new ones, was instructed thoroughly in the hazards which would be met in each and every operation, and in how to combat these hazards. Second, a constant check was made by supervision to see that every employee was working safely, according to the training he had received.

Operating Instructions

In general, too many men and women are placed on new jobs with no instruction other than how to start and stop the machine. And, in some cases, where ample instructions are given, there is no follow-up made to see that they are being carried through.

A new employee or an old employee on a new job has many things to learn and should have help and advice for some time, until he is entirely familiar with every step and process in the operation he is doing.—NATIONAL SAFETY COUNCIL.

American Standards Association

AN ADDRESS by Karl T. Compton, chairman, Massachusetts Institute of Technology, and chairman, Research and Development Board of the National Military Establishment, will climax the four-day series of conferences at the thirty-first annual meeting of the American Standards Association October 11-14. Dr. Compton will speak at the annual meeting luncheon Friday October 14. The meeting is to be at the Waldorf-Astoria Hotel in New York.

Committee Activities

Meetings of sectional committees and correlating committees will open this thirty-first annual meeting on Tuesday, October 11. The company member conference will convene on Wednesday October 12, and the conference of executives of organization members of the ASA will meet Thursday morning October 13. Tentative plans for Thursday afternoon have been made to hear reports on international developments in standardization by representatives of the American delegation who attended the summer meetings of the International Organization for Standardization in Paris. In the evening the board of directors will meet, and the Standards Council will go into session on Friday morning October 14.

Joint Session

Following the annual meeting luncheon Friday, October 14, the Board of Directors and the Standards Council will meet together. This meeting will be open to ASA Members and all are urged to attend to hear firsthand the report of accomplishments and plans for the future and to participate in the discussions.

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Produces crystal clear ice, essential for public health and food preservation. RECO plants similar to these are performing yeoman service all over the world . . . building daily profits for their owners.

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- Can Dumpers
- Can Fillers
- Ice Cans
- Ice Vending Depots

(Refrigeration Engineering Corporation)

RECO PRODUCTS DIVISION
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NEW PLANTS AND IMPROVEMENTS

Information pertaining to proposed new plants utilizing refrigerating equipment, as well as additions, improvements, and rehabilitation of existing plants. News regarding such new plants and additions is invited for publication in this department.

ALABAMA

Wetumpka, Ala.—A No. 14 Polar ice vendor has been installed by the Wetumpka Ice & Coal Co.

ARKANSAS

Tuckerman, Ark.—Crystal Ice Company has placed its new 20-ton capacity ice plant in operation here. It is owned and operated by C. M. Graham and H. E. James.

CALIFORNIA

Oakland, Calif.—Two Model 16 Stations have recently been delivered to the American Ice Co. S & S Vending Machine Co. of San Jose supplied the equipment.

Redding, Calif.—Union Ice Co. has recently installed a Model 16 S & S Ice Vending Station.

COLORADO

Denver, Colo.—Another Model 16B ice vending station is in operation here, operated by Earl Maddox, Jr. of the Maddox Ice Co. Equipment was supplied from the California plant of S & S Vending Machine Co.

Durango, Colo.—Durango Ice & Produce Company has resumed business in the 500 block on Railroad Street south of the fire-destroyed plant, which was razed by a fire on June 2. At present the firm is selling storage ice salvaged from a storage room untouched by the fire, and this will be supplemented by manufactured ice shipped from Alamosa.

LaJunta, Colo.—LaJunta Ice & Cold Storage Co. has a No. 1410 Polar station with two vendors.

FLORIDA

Fort Pierce, Fla.—A remodel and alteration job on the 100 x 200 ft. building of the Royal Palm Ice Company located at Avenue B and the Florida East Coast Railroad, has been authorized here. Tentative cost has been estimated at $40,000 and will include relining walls and new insulation of roofing. Height of the existing walls probably will be raised, it was said.

Panama City, Fla.—Kilbourne Ice Company here has installed a model 14 Polar ice vending machine for cake ice.

Tallahassee, Fla.—A model 14 Polar ice vendor is now in operation at the plant of the Middle Florida Ice Company.

GEORGIA

Dalton, Ga.—The Dalton Ice Company is now operating a model 14 Polar ice vending machine.

Metter, Ga.—A model 14 Polar ice vendor has been recently installed in the plant of the Millen Ice Company here.

Perry, Ga.—J. H. Davis & Son recently completed their new ice manufacturing plant at Houston Lake. The new plant produces 28 tons of ice a day from the artesian water that comes from wells at the lake. The structure is 65 x 65 ft. and houses the latest equipment made by the Frick Co. The storage house holds 55 tons of ice.

ILLINOIS

Arcola, Ill.—The Citizens Ice & Coal Company has installed a new S & S self-service ice vending machine on Oak Street.

Mattoon, Ill.—Two new S & S ice vending machines have been installed by Citizens Coal & Ice Company.

IOWA

Muscatine, Iowa—George Schmelzer has added automatic ice vending to his ice business with a model No. 26 Polar vendor for 50 lb. cake ice.

Waterloo, Iowa—A model No. .021 Polar ice station with three vendors has been installed by the Crystal Ice Company here.

KENTUCKY

Covington, Ky.—City Ice & Fuel Company has installed additional S & S Ice Vending equipment at Station No. 16 to dispense 25 lb. bags of crushed ice and also a vendor for 10 lb. packages of cubes.

LOUISIANA

Campti, La.—A model No. 024 Polar ice vending station has been installed here by the Gulf Public Service Co.

Lafayette, La.—Gulf Public Service Company has in operation a No. 1410 Polar ice station with two vendors here.

Sterlington, La.—Operation of the new 15-ton automatic ice plant of the Bastrop Ice & Storage Co. recently completed at a cost of $20,000, has begun. Luther Hammonds is manager of the plant.

MASSACHUSETTS

Lawrence, Mass.—A model No. 10 Polar display cabinet has been installed by the Everpure Ice Co.

MINNESOTA

Minneapolis, Minn.—The Cedar Sanitary Ice Co. has installed two No. 2010 Polar Ice Stations with three vendors each, and one No. 2414 Polar station with three vendors to dispense cake and cube ice automatically.

Mankato, Minn.—Sam Hanson has installed a model No. 2212 Polar automatic ice station here and at Austin as well as a No. 2012 Polar station at St. James. The ice vending stations are equipped with three vendors for dispensing 25 and 50 lb. cake ice and bags of cubed ice.

St. Paul, Minn.—Citizens Ice Company is now operating two No. 2012 Polar ice stations with three vendors each for vending cakes and cubes of ice.

St. Paul, Minn.—The Crescent Creamery is operating a No. 149 Polar Station with three vendors for vending both cakes and cubed ice.

NEW YORK

Bronx, N. Y.—City Products Co. recently installed a Model 20C Sturdy-Built Ice Vending Station equipped with S & S ice vending conveyors.

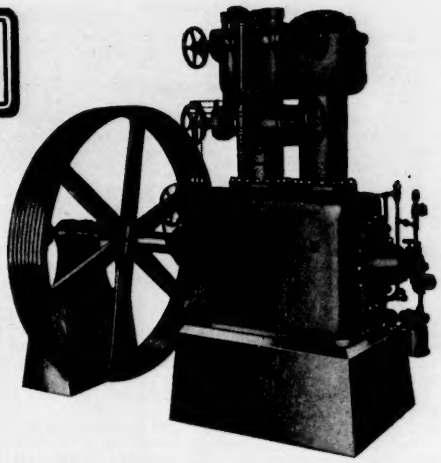
Herkimer, N. Y.—Recent installations have been made for the Ice Service Corp. by F. B. Dickinson & Co. of Des Moines, Iowa, who have supplied S & S Ice Vending conveyors.

Syracuse, N. Y.—The People's Ice Company has purchased a model No. 10 Polar Display cabinet for merchandising packaged ice.

NORTH CAROLINA

Hamptonville, N. C.—Midway Ice & Fuel Company recently installed two No. 014 Polar Stations.

Sterling DEPENDABLE REFRIGERATION



The phrase "STERLING DEPENDABLE REFRIGERATION" is more than a slogan—it's a fact.

Built with rugged strength for endurance, with advanced design for efficiency and economy of operation, STERLING Ammonia Compressors are the product of more than fifty years of "know how" in the manufacturing of refrigeration machinery and equipment.

A complete range of sizes insures the correct compressor for each application.

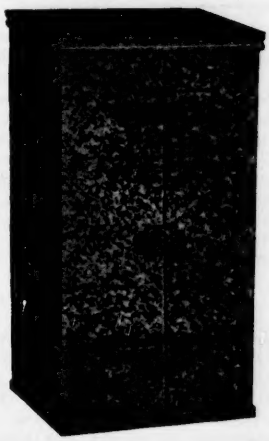
Deliveries are, at present, current—most models of compressors are available from stock.

For complete information, see your nearest STERLING distributor, or write the factory.

REYNOLDS MANUFACTURING CO.

SPRINGFIELD *"Builders of Fine Refrigeration Equipment"* MISSOURI

OHIO SPECIAL ICE CANS



Double Riveted
Welded
Integral Tube Cans
Arctic Pownall Cans
Can Baskets
Condenser Trough

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Industrial Trucks
and Trailers

THE OHIO GALVANIZING & MFG. CO.

NILES *Established 1902* OHIO

OKLAHOMA

Bokoshe, Okla.— Ames Tecumseh has just completed construction of an ice plant two blocks off Main.

TENNESSEE

Memphis, Tenn.—The Park Ice Company has purchased a lot 160 x 294 ft. at the southwest corner of South Trezevant and Enterprise for the purpose of erecting a modern all-electric ice plant on the site.

TEXAS

Charlotte, Tex.—Udden Ice Company of Corpus Christi recently installed a Model No. 018 Polar Station here.

WASHINGTON

Manson, Wash.—The new cold storage building now being constructed by Lake Chelan Fruit Growers here is expected to be finished by September 15, according to announcement by K. J. Hendershott, manager. Built of reinforced concrete the structure is 112 x 240, has two floors.

Oroville, Wash.—A two-story cold storage plant is under construction for the United Fruit Growers. The warehouse will replace the building destroyed by fire recently.

Pasco, Wash.—The Northern Pacific railway recently announced the construction of an $108,000 addition to its ice plant here. The project will allow the icing of 30 additional freight cars at a single time. It consists of construction of a second loading platform, which will be 750 ft. long. The new platform will parallel the track at the east side of the ice house.

WEST VIRGINIA

Huntington, W. Va.—City Ice Delivery recently installed two No. 149 Polar ice stations each with two vendors.

WISCONSIN

Green Bay, Wis.—A No. 149 Polar Station and six vendors are being operated by the Green Bay Ice & Fuel Company.

Sales and Reorganizations

Jacksonville, Fla.—Foremost Dairies Inc. has acquired Frostmobile Inc., Baltimore, Md., one of the state's leading wholesalers of frozen foods, credited with doing an annual business upwards of $500,000.

Nebraska City, Nebr.—Walter Perkins, formerly of Monroe, La., recently purchashed the Nebraska City ice plant from J. A. "Pete" Adams.

New York, N. Y.—The Rubel Corporation has purchased the ice manufacturing property of the Holler Ice Manufacturing Company on Boston Road, near Dyre Ave., the Bronx. According to recorded deed, the deal involved $299,000.

Memphis, Tenn.—The old Bannon Coal & Ice Co. property sold in bankruptcy here March 8 to the highest bidder, W. J. Ayres, has been resold by Mr. Ayres to Southern United Coal and Ice Co. C. H. Gordon, president of the purchasing chain of Jackson, Miss., said it has not been definitely decided what use will be made of the site. Bannon was said to be the oldest ice company in Memphis when it went out of business.

Houston, Tex.—The Burress & Rogers Ice Co. here which has been idle for some time was bought recently by G. O. and Floyd Brinson from Mr. and Mrs. J. D. Burress for a consideration of $100,000. The brothers will renovate the plant at an estimated cost of about $25,000 to $50,000 and will put it back into operation within a few weeks. The plant was built in 1929 and has a daily output capacity of 40 tons.

Richmond, Va.—Sale of the Richmond Cold Storage Co., Richmond, Va., for $512,500 has been announced. All of the capital stock of the company was purchased by a newly-formed corporation, the Laughon Cold Storage Co. Inc., headed by Frank E. Laughon. The Richmond property includes the main plant at Eighteenth and Clay St., and ice stations at 500 N. 31st St., 4514 Williamsburg Ave., 3100 Caroline Ave., and 1914-16 W. Cary St.

OBITUARY

Charles Hosmer Morse III Killed in Airplane Crash

CHARLES HOSMER MORSE III, vice-president in charge of manufacturing, Fairbanks, Morse & Co., Chicago manufacturers, and eldest son of Col. Robert H. Morse, president of the company, lost his life when the Company's big Lockheed Lodestar two motor plane crashed near Roanoke, Ill., Saturday morning, July 9, 1949.

Mr. Morse first worked at the Beloit plant. Honorably discharged as a wounded veteran of World War I he rejoined the organization and worked in the company's factories at Three Rivers, Mich., Indianapolis, Ind., and St. Johnsbury, Vt. Later he was assigned to company branches in many parts of the United States. He was at one time assistant general manager of the Beloit Works. He left Beloit in 1939 to become president of the Inland Utilities Co., a Fairbanks-Morse affiliate. On June 21, 1946, he was elected vice-president in charge of manufacturing, with headquarters at Chicago.

He is survived by his widow, daughter and two sons. He was a brother of R. H. Morse, Jr., vice-president in charge of all operations of the company.

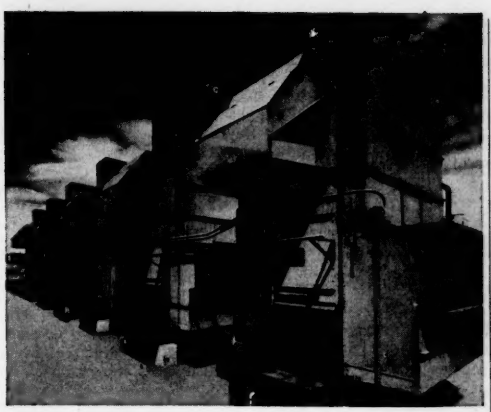
Samuel W. Tardy

THE death of Samuel W. Tardy, manager of the Helena Ice Delivery of Helena, Ark., occurred July 17, resulting from an attack of bronchial pneumonia. He was 76 years old. Mr. Tardy came to Helena in 1922 where he was connected with the Arkansas Utilities ice plant until he organized the Helena Ice Delivery in 1935. He was a member of the First Baptist Church of Helena and of Lafayette Lodge No. 189. He leaves his widow, Mrs. Annie V. Tardy, four sons, four daughters and 14 grandchildren.

THOMAS G. ESTEP, who retired this year as Professor of Mechanical Engineering at Carnegie Institute of Technology, Pittsburgh, Pa., died at his home in Alexandria, Pa. August 8. Prof. Estep, who has served on the Carnegie faculty for 36 years before his retirement, was 66 years old. Born in Alexandria in 1883, he was educated at Pennsylvania State College, where he received a Bachelor of Science in Mechanical Engineering in 1905. Numerous papers have been published as a result of research conducted by Prof. Estep. He was the author of "Problems in Thermodynamics and Heat Power Engineering" and the "Mechanical Engineering Laboratory Manual."

ARTHUR GALLAND who entered the ice business many years ago with the Arctic Ice & Fuel Co. Ltd., of Winnepeg, Manitoba, Canada, as a driver and who retired from the business some four or five years ago as manager of the Arctic Ice Co., Ltd., Edmonton, Alta., Canada, passed away in his home in Victoria, B. C. Mr. Galland was well known by Western Canadian ice dealers with whom he came in close contact on many occasions.

WILLIAM ARTHUR CURRAN, retired supervisor of refrigeration at the Pioneer Division of the Borden Ice Cream Co., Brooklyn, N. Y., died August 3. He was born in Mauch Chunk, Pa. He is survived by his widow, Mrs. Isabelle Williams Curran.



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● Power savings and water savings combine to make money for you when you replace an old fashioned refrigerant condensing method with a modern Niagara AEROPASS Condenser. Either saving quickly returns the cost of the installation; both together make an important reduction in your operating costs for refrigeration.

In this new method the refrigerant gas passes through two cooling coils. The first coil, air-cooled, removes the superheat and condenses oil vapor from the refrigerant; the second condenses the refrigerant by the evaporation of a water spray from its surface. The heat is transferred to the air; less than 10% of the water used in conventional condensers is consumed and you save the cost of the water and the cost of its piping, pumping and disposal.

In addition the Niagara Aeropass Condenser controls the head pressure of your compressors at the lowest point for good operation, reducing your power bills. It does this automatically the year 'round, giving full capacity for peak summer loads and providing the greatest power saving in cold weather.

Hundreds of experiences in all industries that use refrigeration demonstrate these benefits and prove that they give a lasting improvement in refrigeration plant operation.

Write for Niagara Bulletin No. 103 for further information

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No bend is too intricate, no elbow too large, no form too complex for flexible, form-fitting *Ozite* Insulating Felt. Easily applied to all pipes, ducts, and other exposed areas, it can be cut to fit any shape snugly and meshes at joints to form a permanent heat seal.

Ozite Insulating Felt gives highest resistance to heat penetration, retains its efficiency and permanency in the presence of moisture and other adverse conditions and requires no servicing.

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NEW AND IMPROVED EQUIPMENT

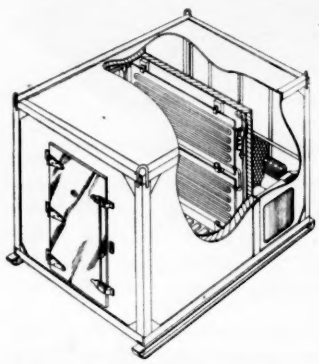
MACHINERY-APPLIANCES-PROCESSES

Information contained in this department is furnished by the manufacturer of the article described and is not to be construed as the opinion of the Editor.

New Portable Storage Rooms

MEETING the demand for portable commercial refrigerated storage rooms, Reco Products Div., of Refrigeration Engineering Corp., has developed a junior series of "cargo reefers." This new line is available in 150 and 200 cu. ft. sizes which are completely welded steel refrigerated enclosures equipped with self contained gasoline and electric driven refrigerating units. Designed particularly for oil field and mining and logging construction camp sites as well as for summer camps, hotels and institutions, these units represent a practical answer to refrigerated storage problems.

They have been designed to permit operation at either zero storage of frozen foods or for medium tempera-



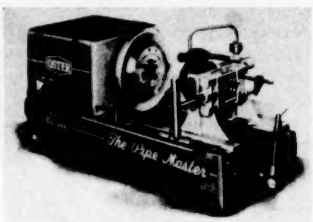
Cutaway line drawing showing construction of 150 and 200 cu. ft. Cargo Reefers.

tures for storing meats, vegetables and other "cooler" products. Exterior is of welded 14 gage steel with coating of gray enamel. Interior is of 18 gage galvanized welded steel. Insulation consists of 6 in. Fibreglas on sides and bottom and 8 in. on top. A separate compartment at the rear houses an air cooled refrigerating system which is operated by an electric motor or combined gasoline and electric motor. The refrigerating system uses Freon 12. Vacuum plate type refrigerating coils are installed on the side walls and ceiling of the inside.

New Pipe and Bolt Threading Machine

KNOWN as the Oster No. 522 De Luxe "Pipe Master", a new threading machine of aluminum construction has been designed with a regular pipe range of ¼ to 2 in. pipe; extra range ⅛ in. pipe; extended range of 2½ to 8 in. pipe when used with drive shaft and geared die-stock; and a bolt range of ¼ to 1½ in.

Designed for light socket connection, the machine is furnished with a universal geared head motor and safety switch for operation on 110 volt either AC single phase or DC (220 volt optional at no extra cost).



New Pipe Master pipe threading machine

Two stationary, quick-opening, adjustable die-heads are standard equipment; one die-head with two sets of dies covers the range of ¼ to ¾ in.; the other die-head with two sets of dies covers the range from 1 to 2 in.

The front chuck, called the "Spinfast", eliminates the need of a chuck wrench. Rear chuck is self-centering. A roller type, self-centering cut-off device requires no adjustment of the two rollers. A cut-off gauge is calibrated for easy setting for any length of nipple up to 6 inches.

An improved type of thread length gauge is another feature. Flat bedways of the machine are replaceable after they become worn after long service. Hinged mounting of motor, switch and pump makes those parts quickly accessible for inspection and maintenance.

The complete machine is regularly furnished for bench use but can be furnished on either a steel stand with 16 inch plain wheels or on a pipe leg stand with tool tray. Net weight of the machine only is approx. 299 lbs.

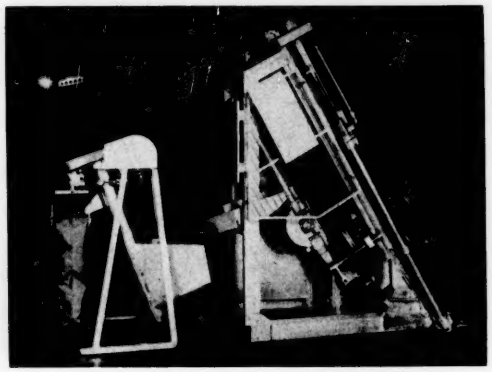
Weighing and Bagging Unit for Ice Cubes

A WEIGHING and bagging unit used in conjunction with existing ice cubing machines has been announced by the Flynn and Emrich Co. of Baltimore, Md., manufacturers of automatic and semi-automatic ice cubers.

The "F & E" weighing and bagging attachment automatically weighs and bags up to 30,000 cubes per hour and marks a definite step forward in the efficient handling of processed ice. Among the features of the "F & E" weighing and bagging unit some of the most important are its speed, its one man operation, its compactness, its fully automatic operation, and its sanitation since no hands touch the cubes.

This attachment, used with an "F & E" cuber, handles the entire operation, from the loading of the cake into the cuber to the unloading of the cubes, weighed and bagged in the desired weight.

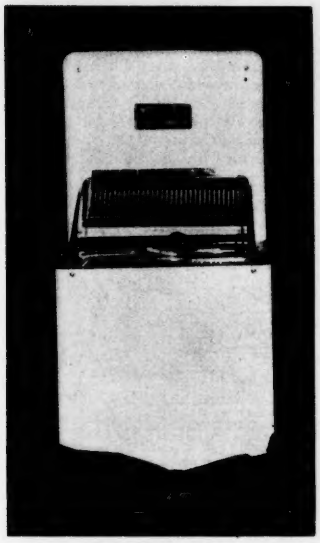
A bulletin describing this equipment in detail and profusely illustrated has been prepared by the Flynn and Emrich Company. Copies may be had by writing the company at Saratoga and Holliday Streets, Baltimore, Md.



New Flynn & Emrich weighing and bagging unit attached to cuber

Servel Ice Cube Machine

A NEW ice cube machine will be manufactured by Servel Inc., of Evansville, Ind. Ajax Corporation of America, a Chicago firm, will be the exclusive distributor. Introduction of the machine, called the Ajax Electric Iceman, was made at Evansville, Ind., by Louis Ruthenburg, Servel Company president.



The new Ajax Electric Iceman made by Servel, Inc.

The new machine it is claimed will produce 360 lbs. or over 7,600 crystal clear cubes per day. Designed to slide under a bar or fountain.

New Insulation Board For Cold Storage Floors

THE addition of a rigid, asphalt-enclosed, cold storage floor insulation board to its line of low temperature insulation products is announced by Owens-Corning Fiberglas Corp. The new board differs from the company's asphalt-enclosed boards employed for low temperature wall and ceiling insulation in that the component glass fibers are arranged parallel to the action of the load, providing increased compression resistance.

Known as Fiberglas AE-F Board, the new product has been designed specifically for use under the wearing slabs of cold storage rooms. Under floor loadings up to 1000 pounds per square foot it will compress less than one per cent. This compression is not progressive. Density of the board is six pounds per cubic foot. Fiberglas AE-F Board is available in two and three-inch thicknesses, 12 inches wide, 36 inches long.

Refrigerated Warehouse Orders are "Flocking" in

THE EYE IS QUICK TO SEE THESE SUPERIOR FEATURES

for MOTO-TRUC MOTORIZED BATTERY OPERATED WALKIE TRUCK

SHORTER. Overall length is up to 15" less than that of other makes of motorized hand trucks, due to more compact power unit.

EASY TO MANEUVER IN NARROWER AISLES, allows more space for storage.

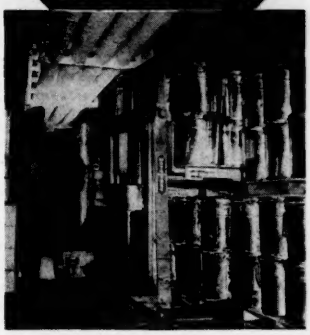
EASIEST CONTROL. Roller type easy grip handle gives two speeds forward and two speeds reverse by an easy turn of the wrist. Hydraulic lift is controlled by push buttons (within finger tip reach) in the ends of the handle.

POWER. 12-volt interchangeable motor unit provides great power and is quickly accessible for inspection and servicing.

LOW TEMPERATURES. All switches, wires, insulations and lubricants are not affected by moisture or temperature changes from 100° plus to 40° minus.

SAFETY, another important advantage. Dead man controls and other safety features offer real protection for both operator and load.

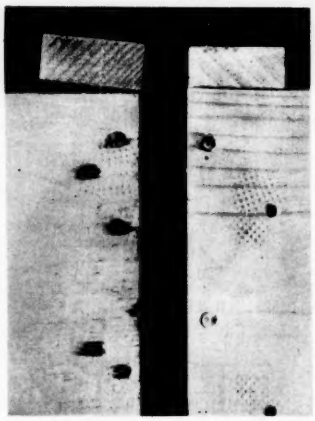
Write for Bulletin No. 49



Moto-Truc Telescopic Hi-Lift and Pallet Trucks are used by many of the largest cold storage warehouses.

New Plastic Coating Preserves Wood

A CLEAR, plastic coating designed to meet the demands of the packing and produce growing industries for more sanitary conditions through the use of a non-toxic yet effective preservative for wooden containers and equipment is being introduced by Calresin Corp., of Culver City, Calif. This new coating, Calresin No. 6-108, field tested by one of the largest packing plants on the West Coast, penetrates, hardens and seals wood, rendering it resistant to attack by organic acids, oils, grease and moisture.



Both containers pictured above were subjected to the same amount of exposure. Container at the right, which was treated with Calresin No. 6-108, shows the protection this plastic coating gives around nails and box ends. In addition, Calresin No. 6-108 prolongs the life of the entire container by rendering it resistant to attack by organic acids, oils, grease and moisture.

The new Calresin coating can be used effectively both in sanitizing and protecting field lugs, wooden machinery sections, wooden tanks and vats, fish boxes, packing tables, cut fruit boxes, dehydrator trays and similar items.

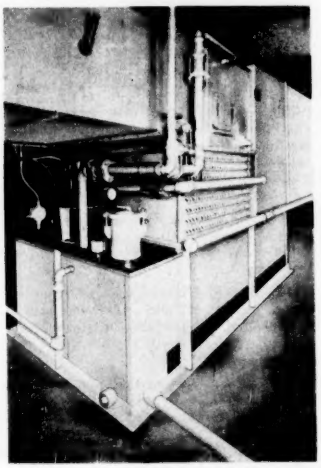
The use of this coating prolongs the life of any wooden container since it guards against weakening of wood from exposure and dry rot, seals against rot around nails, screws, and bolts, and keeps metal clamps and other fasteners secure. Containers can be safely and effectively cleaned with water or steam hose since virtually no water can be absorbed by wood thus coated.

Coating is odorless, tasteless, and non-toxic and therefore will not contaminate food. Since it seals against absorption of taste, stain, or odor, wooden containers coated with it may be used for different types of food. Bacteria and fungi growth is obstructed since neither can enter into the pores of the wood. Wood fibers are sealed down thus preventing danger of splinters.

Containers like field lugs, crates or cases where joint and end grains must be sealed should be dipped in coating. Immersion for 20 to 30 seconds gives proper impregnation, yet allows free run-off when boxes are drained. Containers can be stacked within one hour, but should be allowed to dry 24 hours before use.

New System Prevents Frost on Coils

A SYSTEM for eliminating frost condensation on low temperature heat exchange coils has been developed by the Surface Combustion Corp. of Toledo, Ohio. An adaptation of the Kathabar Humidity Control System, which has been well known to humidity conditioning engineers for many years, the new system may be used in cold storage spaces or for other applications in the industrial fields where a supply of cold dry air is required. Its operation is automatic and continuous and does not lose its maximum efficiency due to frost formation on heat exchange equipment or requiring a complete shutdown for defrosting at regular intervals.

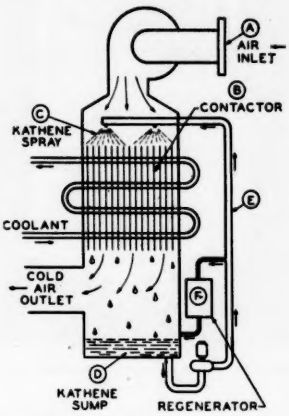


Exterior view of Kathabar system

It is, of course, impossible to cool moist air appreciably without condensing some moisture. Ordinarily this moisture is condensed as frost, which reduces efficiency and blocks the flow of air around the heat exchanger. The Kathabar Frostless System prevents the accumulation of this moisture by spraying an absorbant solution over the cold metal of the heat exchanger. This solution absorbs any condensed moisture and drips down into a sump, after which some of it is passed through a regenerator which extracts moisture from the solution so it will be able to absorb more on the next cycle.

The liquid used to absorb the condensed moisture is Kathene Solution, composed largely of lithium chloride which is non-toxic and non-corrosive. The solution also has a slightly antiseptic effect on the air passing through it and removes dust and odors, while leaving no odor of its own in the air. It is not carried off in the conditioned air and is very easy to regenerate.

Referring to the schematic flow chart, air to be cooled is drawn in to the system through a filter at (A), passing through the blower and the fin type contactor at (B) where it is cooled, and out at the left. Heat is



Schematic drawing showing arrangement of Kathebar Frostless Coil System.

drawn from the air in the contactor by a brine solution which circulates to a compressor, or by direct expansion in the contactor. A continuous spray of Kathene Solution (C) wets the contactor surfaces and absorbs all moisture present, then, carrying the moisture with it, drips off the contactor into the sump (D). From here it is pumped into two lines, one of which (E) leads back up to the spray nozzle where the cycle begins, and the other of which leads through a regenerator (F), in which the moisture in the solution is extracted. Since the capacity of the solution to absorb moisture is extremely great and the regeneration cycle is very efficient, it is usually necessary to bleed off only about 10% of the solution for regeneration.

Utilities needed for the Kathabar System are a small amount of low pressure steam (for use in the regenerator) and electric power to drive the circulating pump and the blower. A standard refrigeration cycle is also required to cool the refrigerating gas or circulating brine.

You Can Save $133.78 or More

- - - - EVERY SIX MONTHS! ! !

REX AIR PURGER

Removes non-condensable gases which cause excessive head pressure. Eliminates hand purging.

Excess pressure from non-condensable gases means loss in efficiency — increased power costs—reduced capacity.

Power consumption per ton of refrigeration increases 6% for every 12 lbs. increase in condensing pressure.

An increase of 10 lbs. pressure means increased power consumption of 2.3 Kilowatts per hour—25 ton capacity ice plant. At 1¼c per Kilowatt this equals $133.78 in six months.

Check your system today—then write for full details on a Rex Air Purger which automatically removes non-condensable or permanent gases.

Built for 10 to 5000 tons refrigeration—any pressure.

Write today.

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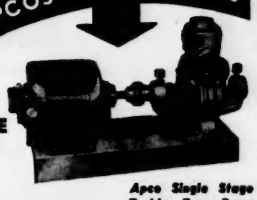
GOOD NEWS! We now carry in stock — in STAINLESS STEEL, APCOS in popular sizes for IMMEDIATE SHIPMENT



Apco Single Stage Turbine-Type Pump

Apco Two Stage Turbine-Type Pump for High Pressure Service

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Now you can obtain immediate shipment on that much needed Stainless Steel Apco Pump. We have been pleased to establish this service for our many friends who find delays expensive and annoying. Drop us a line—find out what sizes we carry in Stainless Steel. Then, when you need ACTION we'll give it to you.

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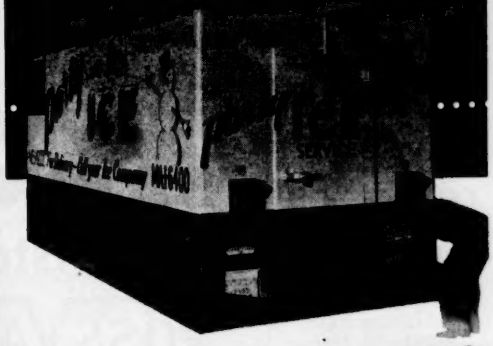
AURORA Always PUMPS
AURORA PUMP COMPANY
Loucks Street, AURORA, ILLINOIS

S & S Sturdy-Built *Refrigerated* Ice Vending Stations



BOOST ICE PROFITS AUTOMATICALLY!

Completely assembled, wired, and ready to operate on arrival at your location, S & S Sturdy-Built Ice Vending Stations are the time-tested keys to profitable ice merchandising. These silent salesmen work for you twenty-four hours a day making cash sales automatically . . . and capturing that profitable "after hour" business you normally lose.
During the three months period ending June of last year one Kansas station operator reported the following sales from one S & S Sturdy-Built Station: 1,758 — 12½ lb. bags of cubes, 1,650 — 25 lb. blocks, and 1,792 — 50 lb. blocks. One Oklahoma operator averaged gross sales of $50 a day during July of last year from block ice sales alone. These are but two of countless enthusiastic reports received from S & S Sturdy-Built Ice Vending Station operators throughout the nation.

DON'T LET THE SALES GO BY

Slash *your* distribution costs . . . step up *your* volume, and boost *your* profit margin with S & S Sturdy-Built Ice Vending Stations . . . for 17 years the ice industry's dependable automatic ice merchandiser.

Write for details, specifications and new low prices.

S&S ICE VENDING MACHINES

REFRIGERATED STURDY-BUILT ICE VENDING STATIONS

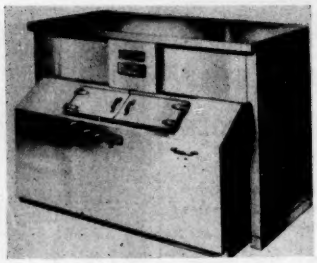
S & S VENDING MACHINE CO.
670 Lincoln Avenue
San Jose, California

F. B. DICKINSON & CO.
Highland Park Station
Des Moines, Iowa

Ice-Flo Automatic Cube Maker

THE Ice-Flo Corporation of Lonsdale, R. I., is now producing an "X" line of automatic ice cube makers. This line is in addition to its established "DC" and "SC" models.

According to the Ice-Flo Corporation, the X-10 model features front delivery into an insulated, stainless steel, storage cabinet which holds approximately 24 hours' production and automatically shuts off when full. The cabinet is detachable and can be rolled away to any convenient dispensing point while another takes its place. It is stated that the



Ice-Flo Cube Maker

X-10 produces 7,360 standard size cubes daily, or approximately 400 lbs. Other X-models will make from 5,440 to 14,720 cubes every 24 hours.

The X-10 has the cabinet top, control panel and storage bin finished in stainless steel. Sides and front are bonderized and painted. Dimensions are as follows: height 50 in., width 60 in., overall depth 39 in. Machine is equipped with a 1 hp. hermetic, water cooled compressor, available in 230 volts single phase a.c. Freon 12 is the refrigerant.

Carrier Ice Cube Maker

PRODUCTION of an automatic ice cube maker has been announced by Carrier Corp. The machine freezes cubes individually. It is refrigerated by a ¾ hp. hermetic compressor and, according to the manufacturer, is capable of delivering 410 lbs. of ice 8,500 cubes) every 24 hours, operating on an approximately ½ hour freezing cycle.

Carrier Automatic Ice Cube Maker

The machine is finished in neutral gun metal gray. Approximately 77 in. high, it occupies a floor area of 25 in. x 24 in. with a bin which stores about 160 lbs. of cubes. An alternate bin of 240 lbs. storage capacity is also available.

When the machine is in operation it automatically delivers ice until the bin is full, at which time automatic controls shut it off until such time as ice is removed from the bin. The freezing cycle then automatically resumes until the bin is completely refilled.

New McQuay Ice Machine

PURCHASE of a building at Faribault, Minn., by McQuay Inc. of Minneapolis to house expanded manufacturing operations has been announced by R. J. Resch, president of the firm. The company manufactures air conditioning and commercial refrigeration equipment. Resch said the Faribault plant will turn out a new automatic ice machine. The firm's Minneapolis plants lack space for this operation, he explained.

Advantages of VOSS COMPRESSOR VALVES

1 LARGER GAS PASSAGE AREA
From 20% to 100% increased valve area handles more and colder gas; a colder therefore denser gas costs less to compress.

2 LARGER VALVE AREA
Raises back and lowers head pressure, consequently reduces compression ratio—saving more power.

3 ELIMINATES SHUT DOWNS
Correct design—best materials—careful workmanship—means continuous performance.

4 SAFE
No castings used—therefore no invisible blow-holes or cracks which insures safety of operation. Gas passages drilled, slotted and milled smooth—hence less friction.

5 LONG LIFE
Made to the highest standard of workmanship—on special machines—by craftsmen—in a modern and well equipped shop—designed to give long life under the severest conditions.

6 NOISELESS
Smooth running—with less power—at higher speeds—without overheating.

7 ECONOMICAL
Increased capacity at a definite saving in power—replaces your present valves without any change in your compressor.

DEFINITE SAVINGS after installing J. H. H. VOSS VALVES
REG. U.S. PAT. OFF.

in your compressors

VOSS VALVES are indispensible for use where loads are heaviest; where lower operating costs are important; where safety and reliability are paramount. Increased speed after change over to VOSS VALVES often makes it possible to carry load with one compressor instead of two needed before.

Quotations and estimates on VOSS VALVES furnished on request. Case histories and testimonials of installations similar to your own supplied. Send us the name, bore, stroke and speed of your air, ammonia, or gas compressor of any type or size.

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WITH THAT PURE AND DRY

ARMOUR'S ANHYDROUS AMMONIA

Armour's Anhydrous Ammonia is pure and dry . . . free of moisture and non-condensable gases. And to insure trouble-free operations, every cylinder is tested and checked before shipping to give positive assurance of fine quality.

Remember, too, that fast shipment is an Armour byword. In fact, many customers receive their Armour's Anhydrous Ammonia the day it is ordered. 65 conveniently-located stock points are your assurance of receiving prompt shipment of Armour's Anhydrous Ammonia in either 50, 100 or 150 pound cylinders where you want it, when you want it and fast.

Please return empty cylinders!

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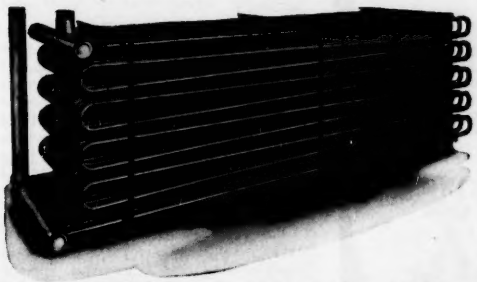

This coil is typical of the many varieties of coils produced by us. Coils, bends or fabricated pipe—coil and tank assemblies are designed and built to your requirements. Send details for engineering assistance and quotation.

REMPE CO.

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Pipe and Fin Coils for Refrigeration and Air Conditioning.

WOLF-LINDE

Est. 1880

"THE OLDEST NAME IN REFRIGERATION"

EVAPORATOR PRESSURE CONTROLS

Sizes ¾" to 6" for use with all refrigerants in pressure ranges from 20" vacuum up to 80 p.s.i.

Manufactured and Sold by

DERSCH, GESSWEIN & VEUERT, Inc.

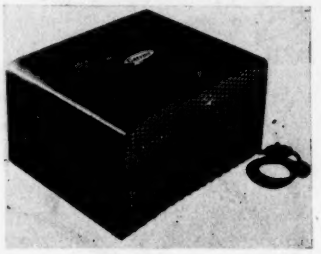
4849 West Grand Avenue Chicago 39, Illinois

New Dehumidifying Unit

A NEW, large capacity, semi-portable dehumidifying unit that operates on a refrigeration principle has been placed on the market by Carrier Corporation as the result of the demand created by an earlier model introduced in 1948. Built around a one-third horsepower condensing unit, the new 53F Carrier "Humidry" has a capacity for removing 34 pints of moisture per day under room conditions of 80 degrees and 70 per cent relative humidity. According to the manufacturer under even more severe humidry conditions, government tests have shown it to take as much as 50 pints from the air per day.

The new model has been designed to be safely installed in any convenient location and requires an electric plug-in connection 110 or 230 volt 60 cycle AC and a floor drain for moisture disposal. It is applicable where rust, mildew, mold, or rot cause damage, deterioration or work delay. While suitable for application wherever high prevailing humidities present a marked goods spoilage problem and halt work progress due to drying problems, the humidry unit also protects permanent records, prized volumes and other valuables stored in vaults, libraries or museums from mold and mildew.

The warm, humid air is drawn over the chilled surface of the copper plate fin type evaporator, dehumidifying coil and moisture from the air is condensed, collected on the coil and drained away. The cool air then passes over the warm condenser surface by forced circulation from the pressed steel fan and is recirculated around the room.



The New 53F Carrier "Humidry"

Other features include a receiver of heavy steel, hydrogen brazed and equiped with integral liquid shut-off valve. An expansion valve regulates the flow of the refrigerant automatically as it flows to the cool coil, while the drain pan collects moisture as it is removed from the evaporator coil. Cabinet dimensions are 18 inches long x 15 inches wide x 12 inches high. Net weight is 125 pounds.

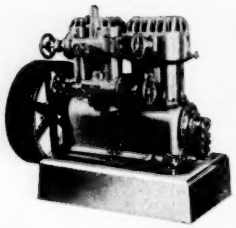
BAKER

Unexcelled

for Dependable Performance

Proved by 44 Years Experience

AMMONIA COMPRESSORS AND CONDENSING UNITS



Refrigerating engineers have learned to depend upon BAKER Ammonia Compressors and Condensing Units for sustained maximum output and long life. The line includes 9 compressor models, 2 to 125 H.P.; also 4 Ammonia Booster Compressors for two-stage compression on extreme low temperature applications.

Baker's long experience, expert engineering, and enlarged manufacturing facilities insure the finest quality — *plus prompt deliveries.*

(Baker Freon Compressors Available in Sizes ½ Thru 60 H.P.)

BAKER AMMONIA VALVES AND FITTINGS

Tested and proved on Baker equipment, the line includes globe and angle valves with screw or flanged ends, screw or bolted bonnets, for all types of service also fittings for every installation need.

Available now through Baker Distributors throughout the United States and in 75 Foreign Countries.

BAKER REFRIGERATION CORPORATION

General Offices: South Windham, Maine

Factories at South Windham, Maine, and Omaha, Nebraska

Expendable Pallets

MANUFACTURE under license of the Addison-Semmes new lightweight expendable pallet made from corrugated materials has been commenced by Robert Gair Co., Inc., New York, manufacturers of folding cartons and containers. These pallets are being made at the more than twenty Gair plants in the Eastern territory.

Expendable pallets have become increasingly popular the past five years due to the ease in handling and stacking goods in shipping and warehousing that results from their use. A fork lift truck can stack palletized goods neatly and evenly in a warehouse to ceiling height, with less time and effort. The pallet is designed for one use only and is cheap enough to be discarded after a single trip.

The pallet is made from "logs" of various diameters rolled from single faced corrugated board on special Addison - Semmes machinery, with corrugated sheets glued to top and bottom of rows of logs, thus making a strong skid.

Not only does this pallet permit stacking of multiple package loads, but it also permits designing of a large "Power Pack", which is a single corrugated container of approximately 64 cubic feet, to carry safely loads of up to 4,000 pounds in one unit.

PITTSBURGH
Air Pressure Tested COILS

Electrically welded, continuous; Air-Pressure-Tested while submerged in water. Built to your specifications. Send for new Coil Data Book and let us quote.

Welded Headers—Welded Ammonia Receivers
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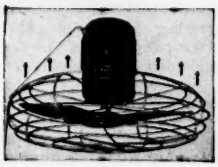
Reco REFRIGERATOR FANS... ...*keep* COOLERS DRY!



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THE NEW *Reco** SYSTEM OF AIR CIRCULATION

Prevents Cross Transference of Flavors in Stored Products.
Dissipates Odors.
Keeps Walls and Ceilings Dry.
Reduces Refrigeration Costs.

FREE MANUAL
Write for Bulletin 241 giving valuable suggestions about upkeep of refrigerated spaces.

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Mfrs. of Refrigerator Fans, Fly Chaser Fans and Meat Choppers
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No "Slop Over" with a PHILLIPS LIQUID RETURN SYSTEM

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POSITIVE PROTECTION TO AMMONIA SYSTEMS UP TO 1000 TONS CAPACITY

PHILLIPS LIQUID RETURN SYSTEM effectively traps all suction line liquid in an accumulator and automatically dumps it into the liquid receiver by one of three methods: Gravity, injector pump, or pressure lift. System is adaptable to any installation where "slugging" now takes place, and particularly on booster systems which run on vacuum. On plant extensions the Phillips Liquid Return System offers an opportunity for added economy and efficiency.

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MODEL C-2
Approved by Underwriters' Laboratories, Inc.

CONTROL ODORS AND MOLD

GENERAL OZONE *Air Clear* EQUIPMENT OFFERS ADEQUATE PROTECTION FROM MOLD AND ODORS

Use *Air Clear* wherever food commodities are stored to reduce spoilage. General Ozone has a complete line of modern ozonizing equipment plus full service facilities for both old and new types. Write us today for further information.

GENERAL OZONE CORPORATION

17 West Sixtieth St., New York 23, N. Y. 1455 West Congress St., Chicago 7, Ill.

Manufacturers of ozone generating equipment for cold storage ● warehouses refrigerated cars ● walk-in coolers ● air recirculating systems.

MANUFACTURERS' NEWS

Canadian Ice Machine Report

CANADIAN Ice Machine Co. Ltd., Montreal, Canada, in six months ended June 30, 1949, earned $1.48 per class "A" share and 54 cents per common share compared with $147 and 54 cents respectively for the like period of 1948, H. V. Shipley, president, reports.

Net profit for the six months, after estimated income taxes, was $37,107 from gross revenue of $1,532,110 which was 24 per cent above 1948. Although a substantial increase in the volume of business is reflected it has been of a type which carries a narrower profit margin than formerly and this is reflected in a reduction in net profit percentage.

At June 30, 1949, working capital was $549,454 compared with $494,370 at the end of 1948. Working capital will be increased through the sale of $250.00 four per cent ten-year serial trust debentures. It is anticipated be maintained over the second half of the year and that increased volume will compensate for lower-mark-ups.

Dow Chemical Builds New Ammonia Plant

PLANS for the construction of a five million dollar ammonia plant at Freeport, Texas, have been announced by Leland I. Doan, president of The Dow Chemical Co., who cited the project as evidence of his company's optimism toward the future. The plant will have a capacity of approximately 100 tons per day.

Field construction is expected to start about January 1, Mr. Doan said, and it is anticipated the plant will be in operation late next year. The plant will utilize hydrogen available from the company's huge chlorine plant there and combine it with nitrogen from the air to form anhydrous ammonia. Mr. Doan described the process as the Haber-Bosch process used in production of ammonia at Dow's Michigan and California locations, and said it would employ 1,000 hp. gas engines for compression of the air and hydrogen.

Generally broadening industrial uses for ammonia plus promising agricultural markets led to the company's decision to build the plant, Mr. Doan said. Direct injection of ammonia into the soil to supply free nitrogen is a recent agricultural development which has been of particular interest in the southwest.

Jewett Acquired by Ruslander & Sons

THE Jewett Refrigerator Company, 100-year-old manufacturing concern, Buffalo, N. Y., has been acquired by interests of the 60-year-old manufacturing and jobbing company, Ruslander & Sons Inc. Harold Ruslander, vice president of Ruslander succeeded Joseph A. Archbald as president of Jewett.

Edgar B. Jewett is vice-president of Jewett a position he held before the Ruslander interests acquired the company's stock. Richard Ruslander, vice president of the Ruslander company is secretary of Jewett. Miss Mae Zolki, secretary and treasurer of Ruslander, is treasurer of Jewett.

Jewett Refrigerator will continue to operate in its present quarters. It employs about 50 workers and manufactures commercial refrigerators, mortuary refrigerators and ice chests.

Manufacturing operations of the Ruslander company, which for years have been located at 214 Lower Terrace, have been shifted to 18 Letchworth St., part of the Jewett Refrigerator property. The Ruslander company manufactures and serves as jobbers of heavy-duty kitchen equipment for hospitals, hotels, restaurants, plant cafeterias and steamships.

New Pure Carbonic Plant in Pittsburgh

A NEW carbonic gas cylinder filling plant and "Dry-Ice" warehouse has been opened by Pure Carbonic, Inc., in Pittsburgh, Pa., according to an announcement by E. R. Lawrence, president. The new plant and warehouse point is located at 1117 Metropolitan Street, Pittsburgh, with J. M. Brown, branch manager in charge.

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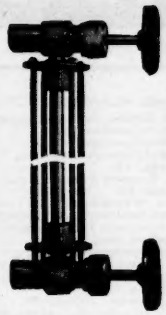

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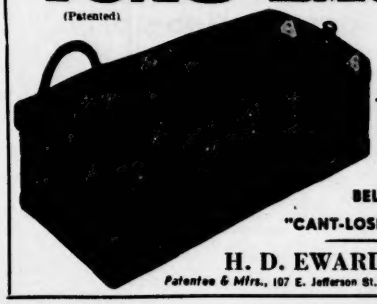

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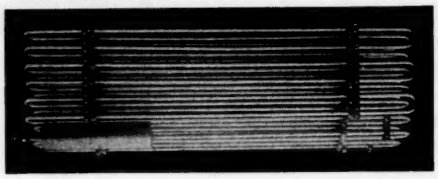

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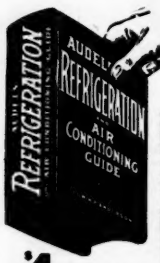

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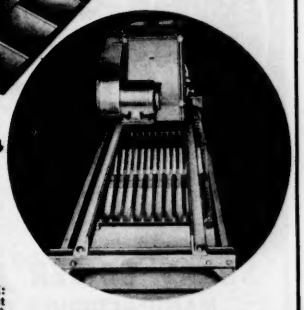

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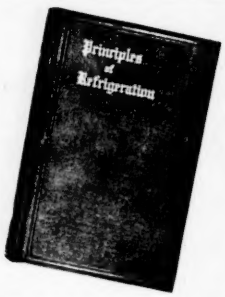

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United Ice Supply Co., Boston, Mass.
Vivian Mfg. Co., St. Louis, Mo.

ICE CUBING MACHINES
Flynn & Emrich Co., Baltimore, Md.
Gifford-Wood Co., Hudson, N. Y.
Lilly Co., The, Memphis, Tenn.
Thermo Cuber Co., Chicago, Ill.
United Ice Supply Co., Boston, Mass.

ICE DELIVERY BAGS
Eward Co., H. D., Ft. Wayne, Ind.
Gifford-Wood Co., Hudson, N. Y.
Index Coupon & Supply Co., La Porte, Ind.
Lilly Co., The, Memphis, Tenn.
Martocello & Co., Jos. A., Philadelphia, Pa.
Pittsburgh Waterproof Co., Pittsburgh, Pa.
Union Bag & Paper Corp., New York, N. Y.
United Ice Supply Co., Boston, Mass.
Vivian Mfg. Co., St. Louis, Mo.

ICE ELEVATORS AND CONVEYORS
Gifford-Wood Co., Hudson, N. Y.
Link-Belt Co., Chicago, Ill.

ICE HARVESTING MACHINERY & TOOLS
Gifford-Wood Co., Hudson, N. Y.
United Ice Supply Co., Boston, Mass.

ICE MAKING AND REFRIGERATING MACHINERY
Baker Ice Machine Co., Inc., South Windham, Maine
Creamery Package Mfg. Co., Chicago, Ill.
Dersch, Gesswein & Neuert, Inc. Chicago, Ill.
Frick Company, Waynesboro, Pa.
Howe Ice Machine Co., Chicago, Ill.
Kehoe Machinery Co., Inc., R. P., Ridgefield Park, N. J.
Martocello & Co., Jos. A., Philadelphia, Pa.
Refrigeration Engineering Corp., Philadelphia, Pa.
Reynolds Mfg. Co., Springfield, Mo.
Vogt Machine Co., Henry, Louisville, Ky.

ICE PICKS AND PLANERS
Gifford-Wood Co., Hudson, N. Y.
Index Coupon & Supply Co., La Porte, Ind.
Lilly Co., The, Memphis, Tenn.
Martocello & Co., Jos. A., Philadelphia, Pa.
United Ice Supply Co., Boston, Mass.
Vivian Mfg. Co., St. Louis, Mo.

ICE PICK SCABBARDS
Gifford-Wood Co., Hudson, N. Y.
Martocello & Co., Jos. A., Philadelphia, Pa.
United Ice Supply Co., Boston, Mass.
Vivian Mfg. Co., St. Louis, Mo.

ICE PLANTS
Kehoe Machinery Co., Inc., R. P., Ridgefield Park, N. J.
Refrigeration Engineering Corp. Philadelphia, Pa.

ICE RECORDING MACHINERY
Jamison Cold Storage Door Co., Hagerstown, Md.

ICE SCALES
Gifford-Wood Co., Hudson, N. Y.
Lilly Co., The, Memphis, Tenn.
Martocello & Co., Jos. A., Philadelphia, Pa.
United Ice Supply Co., Boston, Mass.
Vivian Mfg. Co., St. Louis, Mo.

ICE TOOLS
Gifford-Wood Co., Hudson, N. Y.
Index Coupon & Supply Co., La Porte, Ind.
Lilly Co., The, Memphis, Tenn.
Martocello & Co., Jos. A., Philadelphia, Pa.
United Ice Supply Co., Boston, Mass.
Vivian Mfg. Co., St. Louis, Mo.

ICE VENDORS
Dickinson & Co., F. B. Des Moines, Ia.
Frick Company, Waynesboro, Pa.
Jamison Cold Storage Door Co., Hagerstown, Md.
Refrigeration Engineering Co. Minneapolis, Minn.
S & S Vending Machine Co., San Jose, Calif.
Thermo Cuber Co., Chicago, Ill.
United Ice Supply Co., Boston, Mass.

ICED DISPLAY CASES
(See Display Cases)

INSTANTANEOUS HEATERS
National Pipe Bending Co., New Haven, Conn.

INSULATING MATERIALS
American Hair & Felt Co., Chicago, Ill.
Armstrong Cork Co., Lancaster, Pa.
Mundet Cork Corp., Brooklyn, N. Y.
Pacific Lumber Co., San Francisco, Calif.
Pittsburgh Corning Corp., Pittsburgh, Pa.

LOW TEMPERATURE EQUIPMENT
(See Ice Making and Refrigerating Machinery)

MATERIALS HANDLING EQUIPMENT
Ohio Galvanizing & Mfg. Co., Niles, Ohio
The Mote-Trac Co., Cleveland, Ohio

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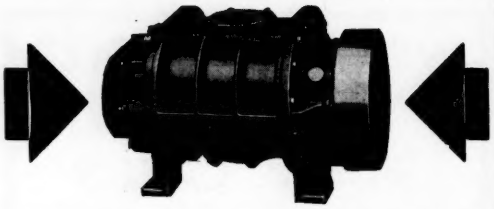

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THE BUYERS

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Sun Oil Co., Philadelphia, Pa.
Texas Co., The, New York, N. Y.

OILS, CUTTING
Socony-Vacuum Oil Co., Inc., New York, N. Y.
Sun Oil Co., Philadelphia, Pa.
Texas Co., The, New York, N. Y.

OIL SEPARATORS
King-Zeero Company, Chicago, Ill.

OILS, FUEL
Socony-Vacuum Oil Co., Inc., New York, N. Y.
Sun Oil Co., Philadelphia, Pa.
Texas Co., The, New York, N. Y.

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Vivian Mfg. Co., St. Louis, Mo.

PALLET TRUCKS (MOTORIZED)
The Moto-Truc Co., Cleveland, Ohio

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Chicago Nipple Mfg. Co., Chicago, Ill.
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Kehoe Machinery Co., Inc., R. P., Ridgefield Park, N. J.
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Refrigeration Engineering Corp., Philadelphia, Pa.

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Deming Co., The, Salem, O.
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Frick Company, Waynesboro, Pa.
Rex Engineering & Sales Co. Oklahoma City, Okla.

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Vogt Machine Co., Henry, Louisville, Ky.

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Refrigeration Engineering Co., Minneapolis, Minn.
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SPRAY COOLING SYSTEMS
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Ruppright, Siegfried, Los Angeles, Calif.

SPRAY NOZZLES
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SPRAY PONDS
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Martocello & Co., Jos. A., Philadelphia, Pa.
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TRUCKS, MOTORIZED LIFT
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Howe Ice Machine Co., Chicago, Ill.
Niagara Blower Co., New York, N.Y.

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Phillips & Co., H. A., Chicago, Ill.
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Layne & Bowler, Inc., Memphis, Tenn.

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Pittsburgh Pipe Coil & Bending Co., Pittsburgh, Pa.
Rempe Company, Chicago, Ill.
Vogt Machine Co., Henry, Louisville, Ky.

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Layne & Bowler, Inc., Memphis, Tenn.

WROUGHT IRON PIPE
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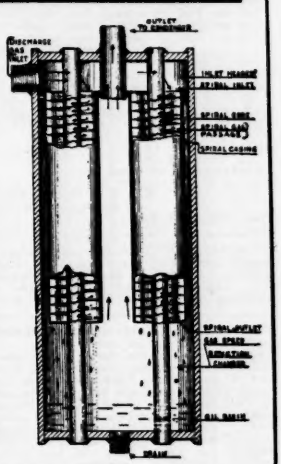

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WANTED—In the market for any good used refrigerating and ice making equipment you may have for sale. Address Box DC-19, Ice and Refrigeration, 435 N. Waller Ave., Chicago 44, Ill.

FOR SALE—8x8 Creamery Package ammonia compressor, V-belt drive, equipped with Voss valves, Serial No. 6101, complete with 40 h.p. G.E. motor and Westinghouse magnetic starter. Arden Farms Co., F. C. Cornford, P. O. Box 3067, Seattle, Wash.

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1—40 ton York ice making plant—brine coolers electric driven.
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1—12 ton York ice making plant—trunk coil electric driven.
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1—10x10 York 360 r.p.m. F.F. lubrication.
1—10x10 York 275 r.p.m. F.F. lubrication.
1—7½x7½ York 225 r.p.m.
1—6½x6½ York 300 r.p.m. F.F. lubrication.
1—6¼x6¼ Baker 300 r.p.m. F.F. lubrication.
1—6x6 York 360 r.p.m. F.F. lubrication.
1—6x6 Frick 277 r.p.m.
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2000' of 2" pipe coils 20' & 10' lengths 8" flanged return bends.
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1—6"x6" two cylinder Frick Ammonia compressor, high speed.
1—6"x6" two cylinder Voss high speed ammonia compressor.
1—5"x5" two cylinder York high speed ammonia compressor.
2—4"x4" two cylinder York high speed ammonia compressors.
1—3"x3" two cylinder Frick unit, high speed.
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1—25" dia. x 10'0" long 5 pass enclosed type ammonia condenser.
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	Item No.
1—5x5 York, 200 RPM	16
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Pipe

10,000 feet wrought Iron pipe—2"—like new	451

Scoring Machines

2—Giffords wood	512

Complete Ice Plants

	Item No.
1—15-ton electric driven plant	630
1—600 Can Trunk Coil Type—York Plant, Brand New Tank. *Complete with 10 Can Grids. This plant is equal to new*	631
Brand New 8 to 10-ton Clear Ice-Making Plants—110 Cans—Electric or Diesel Drive—2 Can Pull	632
3—*247 Can, 22-ton ice plants, like new*	632A
1—15 Ton Diesel Driven Plant	633
1—35-38 ton New Clear Ice Making Plants	635

Self-Contained Units

2—3x3 York & Frick—390 R.P.M.	741
2—4x4 Yorks—390 R.P.M.	742
1—5x5 York—390 R.P.M.	743
1—4½x5 Lipman—360 R.P.M.	744
1—3x3 Worthington	748
1—5x5 Frick—Forced Feed—400 R.P.M. Latest Type	758

Brine Coolers

1—34x12—96—2—Retubed	801
1—34x10—100—2	802
1—48"x16'—130—2" tubes	808

Condensers

3—100 ton shell and tube condensers retubed	919
2—Stands—Vogt Multi-tube—Each stand 6 pipes high. Each pipe 9"x18" with 7—2" tubes	920
1—125-ton, Vertical Shell & Tube, 196 2" tubes	921
1—120 ton, 216—2" retubed Vertical Shell & Tube	922
1—50 ton Horizontal—retubed	923
2—20 ton Horizontal—retubed	924

Ice Cans

96—11½"x22½"x46"—Refinished in zinc
400—11½"x22½"x44"—cap refinished in zinc

Ice Cubers

1—100 lb. Uline Automatic Cuber

Motors

1—100 H.P. Westinghouse Motor—V Belt Drive

NEW EQUIPMENT FOR IMMEDIATE DELIVERY

Compressors With or Without Motors

	Item No.
3x3 to 5 x 5 —390 R.P.M.	1001
6x6 to 10x10—390 R.P.M.	1002
3x3 to 5 x 5 —Self-contained units, complete	1003
5x5—Self contained—15 H.P. motor—V Belt	1004

Ammonia Condensers

4—12¾x12 Horizontal—36—1¼" tubes	1020
2—30x14 Vertical 109—2" tubes	1021
1—16"x10"x10' Shell and Tube Condenser, 60 1¼" tubes	1022

Evaporative Condensers

20-40-50 ton condensers	1030

Ice Cans

50—100 lb. cans—15½"x8"x31"	1041
40—50 lb. cans—6"x12"x26"	1042

Ammonia Valves and Fittings

⅜" to ¾"—Screwed Expansion Valves	1050
½" to 2"—Screwed Globe Valves	1051

	Item No.
1" to 6"—Square Flanged Globe Valves	1052
Check Valves	1053
Relief Valves	1054
Strainers	1055
Steel & Malleable Fittings	1056
Extra heavy Ammonia Nipples	1057

Ammonia Gauges

High and Low Pressure Type	1060

Ammonia Receivers

All Sizes.

Ice Crushers

Gas and Electric Driven	1070

Agitators

New 2 H.P. and 3 H.P. Vertical Agitators

Cold Storage Doors

Receivers and Oil Separators

All sizes	1080

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RIDGEFIELD PARK, N. J.

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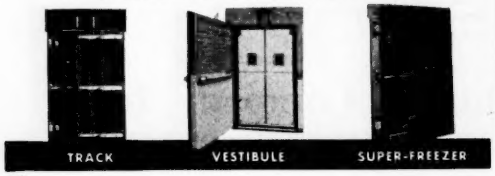

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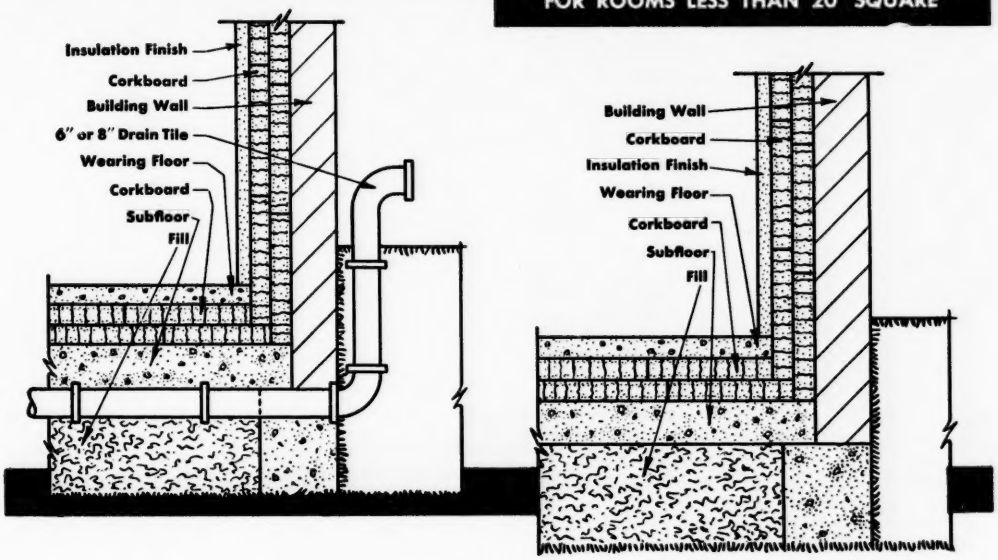
FOR ROOMS MORE THAN 20' SQUARE

FOR ROOMS LESS THAN 20' SQUARE



How to build a freezer room floor

Most freezer rooms more than 20 feet square and built directly on or below grade will eventually freeze the ground beneath them—even though floors are well insulated. This freezing of the ground causes gradual formation of a frost dome that will grow under the subfloor until it finally cracks and buckles the freezer room floor above. To prevent such destruction, Armstrong engineers and laboratory scientists have developed a simple set of construction specifications.

Air ducts, either of concrete or drain tile, are spaced at regular intervals in a cinder or crushed stone fill under the subfloor. These ducts, laid across the short dimension of the floor, allow for maximum circulation of warm air to dissipate frost and keep ground temperatures above the freezing point.

Ducts are not necessary for smaller size freezer rooms because enough heat from the outside will work its way in under the subfloor to prevent frost formation. However, these subfloors should be laid on a fill of about 16 inches of cinders or crushed stone so that adequate drainage is provided.

These specifications, solving a common problem in a practical and low-cost manner, are examples of the kind of thinking that prevails among the men who plan and erect Armstrong's insulation jobs. When you have an insulation problem, consult Armstrong's Insulation Contract Service. You'll get the advantage of Armstrong's long experience and time-tested engineering practices. For full information write today to Armstrong Cork Company, Building Materials Division, 4509 Concord Street, Lancaster, Pa.

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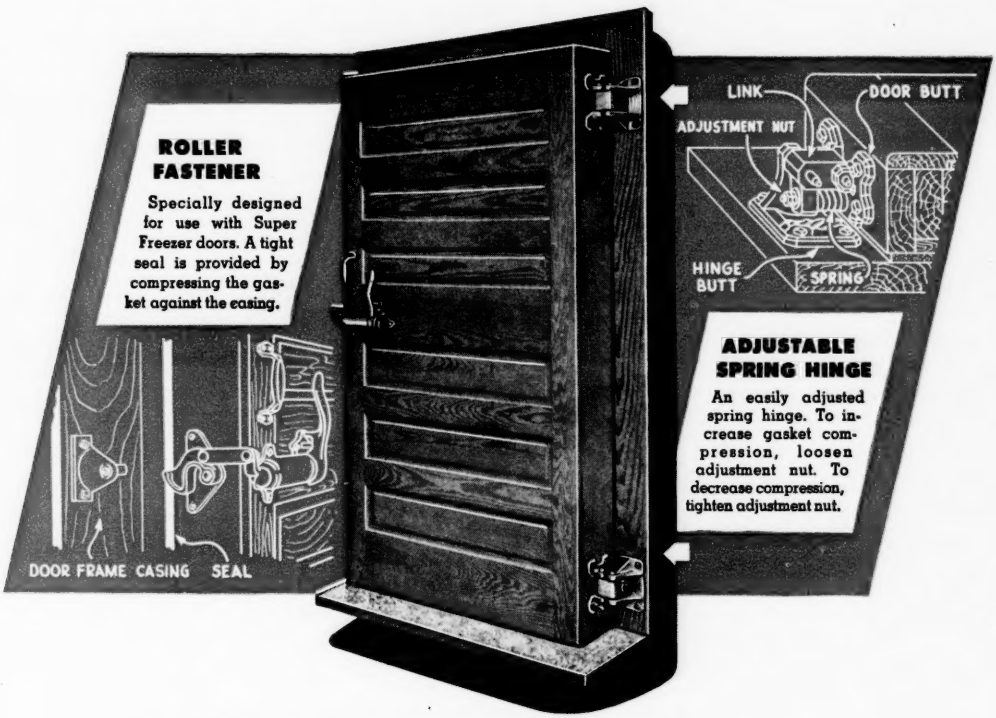
MATERIALS INSTALLATION

FOR ALL TEMPERATURES FROM 300° F. BELOW ZERO TO 2800° F.

The DOOR that helped make quick freezing possible

. . . JAMISON-BUILT Super Freezer

This Super Freezer Cold Storage Door is of the Stevenson overlap type for service at sub-freezing and sharp freezing temperatures. It is far superior for ice cream hardening rooms, frozen food storage, low-temperature test rooms, and similar applications. Hardware of extraordinary strength and unusual design is used on these doors.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DOOR BUTT
ADJUSTMENT NUT
HINGE BUTT
SPRING
ADJUSTABLE SPRING HINGE
An easily adjusted spring hinge. To increase gasket compression, loosen adjustment nut. To decrease compression, tighten adjustment nut.

Standard models of this Jamison-built Super Freezer Door are available in a wide range of sizes. Should you require special types or sizes, we are equipped to build them to any specification. Write for the address of our nearest branch office or send for complete catalog to Jamison Cold Storage Door Co., Hagerstown, Maryland.

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